In This Issue: Helpful Suggestions for the Christmas Electrical

JOURNAL OF ELECTRICITY

VOL. 41 NO. 11 SAN FRANCISCO, DECEMBER 1, 1918 PER COPY, 25 CENTS

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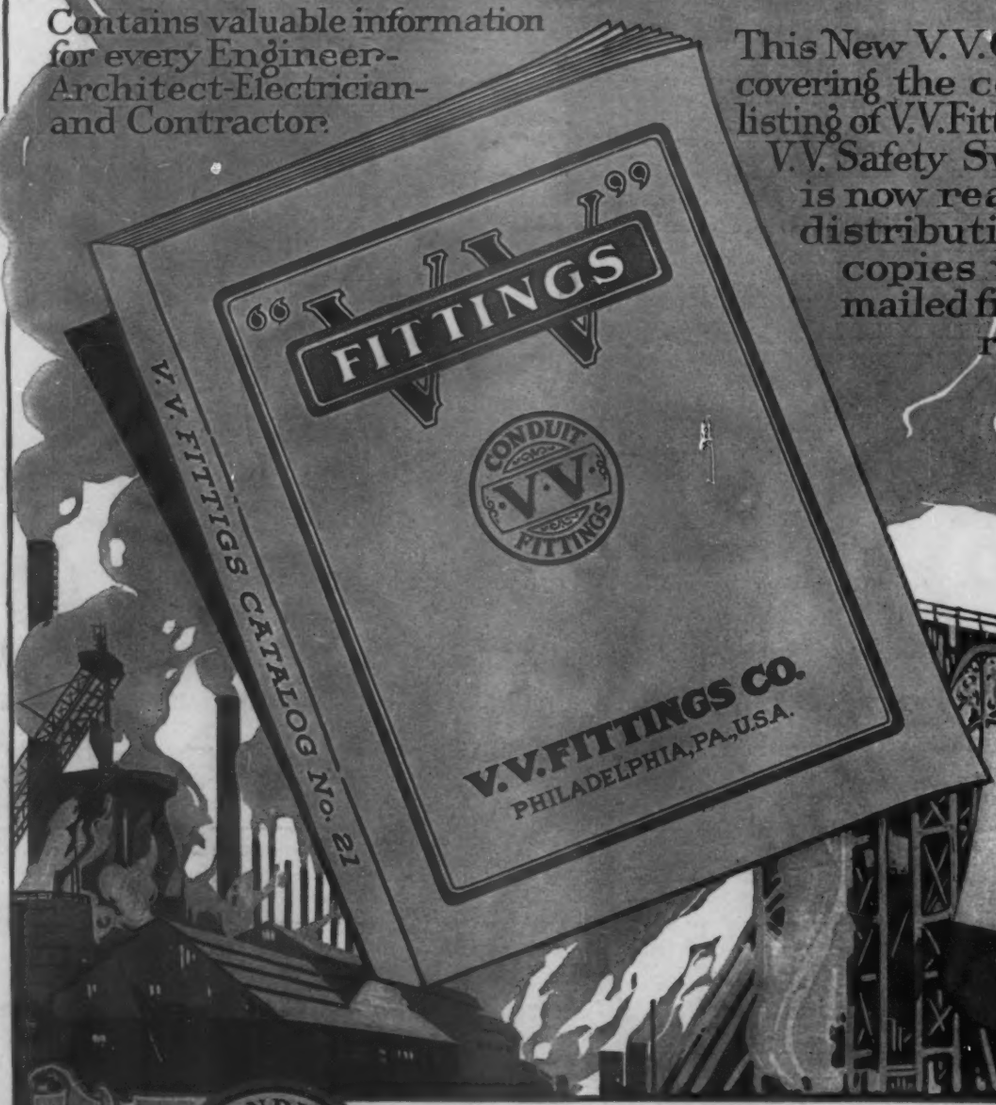

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The Christmas Electrical

From the gorgeous and dazzling electric beauty of the Panama Pacific International Exposition to the electrically illuminated Christmas tree, the West—developed to a degree experienced nowhere else in the world in the method electrical—with its outdoor life and its buoyancy of spirit, offers possibilities for the Christmas Electrical well worth the serious thought of every member of the electrical industry.

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JOURNAL OF ELECTRICITY

DEVOTED TO THE UPBUILDING OF THE ELECTRICAL INDUSTRY IN THE WEST AND IN THE COUNTRIES BORDERING THE GREAT PACIFIC

Volume 41 SAN FRANCISCO, DECEMBER 1, 1918 Number 11

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"Less talking and more caulking" proved an effectual slogan in shipbuilding in the West during the thrilling period of the war. In getting immediately at the task now open before each individual without further awaiting the arrival of the far heralded era of reconstruction this slogan may be made to apply equally well.

California Cooperative Campaign

Many thousands of eyes have been fastened on the work of the California Electrical Cooperative Campaign during the past year and now that the season approaches for its supporters to stop and take stock of the actual achievements before embarking upon another year of activity, it is well briefly to review the situation and weigh carefully some of the results that have thus far been attained.

First and foremost, a magnificent and enduring work has been accomplished in bringing to bear a unified and concerted effort in upholding the government in all matters that pertained toward war work in so far as conservation in men, material and finance are concerned. It will be hard for the future historian to trace to its ultimate limit the full effect brought about by pleas for assistance in priority rulings, in power service and in merchandising of electrical ware due to the timely work of this cooperative campaign. Every thoughtful citizen will grant that the spirit of the law and not its letter was the real factor that brought about such splendid results in California, and in this great work surely meetings such as those held in Los Angeles, Oakland, San Francisco and other communities of the state had a far-reaching effect. And the war, though over upon the battlefields of France, is not over in its effects upon world affairs. Hence in the trying reconstruction period now upon us, this vital force—this spirit of an industry standing united and harmonious—awakened throughout California by the helpful influence of the California Electrical Cooperative Campaign, is needed and needed badly.

Coming down to a closer analysis, even greater permanent good has been accomplished than this splendid war service effort just referred to. No one who attended the meetings of this campaign and who followed thoughtfully the work of the Advisory Committee and its Field Agents can help but see that an enduring work is being accomplished in California in establishing a firmer business outlook in this state for the electrical industry that will reap, in days to come, an hundred fold in dividends.

The central station, which must eternally depend upon an enlightened public opinion for just and fair treatment both in marketing its product and in the development of new water power, finds today in California a vastly broadened field of supporters and an industry that is better informed as to its needs for the immediate future.

The electrical manufacturer finds a keener appreciation among men of the industry for his tireless efforts in meeting new and improved demands upon his creative talent. The jobber finds in a more harmoniously developed industry a quickened pulse for the merchandising of his ware, while the contractor-dealer is beginning to experience the effects of the public call for a far wider application of the method electrical in the business life and in the domestic life of this commonwealth, now acknowledged in all sections of the nation to be more highly developed in the utilization of the method electrical than any other section of the world.

It is difficult to foretell the exact trend of world events immediately ahead, but one thing is certain. Those tasks in which harmonious and concerted action are developed to a high degree are bound to meet with a larger degree of success than disorganized and purely selfish effort. In view of this one outstanding argument alone the demands of the reconstruction period now upon us furnish the urge not only for continuance of the work of the California Electrical Cooperative Campaign during the next year, but for its enlargement.

An Electrical Conservation Christmas

Last year the Society for Electrical Development spent some time and money in working up an Electrical Christmas. And it was a great success. This year the government through the Council of National Defense has asked for a sensible and useful Christmas. With a little extra effort of advertising to tie in with this movement, the results may be almost as effective for the electrical merchant as last year's campaign. At first the ruling was against Christmas giving of all sorts, but

realizing that this could not be enforced and at the plea of the associated retail merchants, the board reversed its order and requested the giving of useful gifts alone. All electrical gifts are useful gifts—and in pressing these sales and diverting expenditure from wasteful channels, the electrical trade is serving the wishes of the government.

Indeed, electrical gifts, in their release of labor and economy of fuel are of peculiar war value to society. It is worth pointing out to the public that the electric iron not only saves time and fuel, but releases iron in avoiding duplication of equipment otherwise necessary. In a recent report on electric appliances to the War Industries Board, figures for the sale of electric irons during 1917 were given at 1,071,950 — and it is estimated that this meant a saving of over 2,000 tons of iron and steel. 24,700 electric ranges were sold during the same year. The electric range uses only from 50 to 60 per cent of the iron required in a coal range and requires less than half as much fuel. In addition, fully 70 per cent of the electric ranges sold were installed in territories where the electricity is generated from water power and hence may be reckoned as saving the entire fuel consumption. Washing machines, dishwashers and table equipment are making economy possible for hundreds of housewives and helping to solve the labor congestion. The electrical merchant is peculiarly fortunate in his position for a Christmas trade —it remains only for him to take advantage of his opportunity.

War Gardening Among Employes

The food situation of this year is not to be changed by any developments in the battlefront or in diplomatic conferences. The harvests of the world are largely gathered—and for this winter, at any rate, the United States is to be called upon to feed the world. In this connection the war gardening of schools and householders, not to mention the employes of big companies and power station attendants, has been of no mean service. Its value has not lessened and wherever the mild weather of the Pacific Slope makes winter crops possible, the undertakings should be encouraged to go on.

The value of the efforts of the school children has been recognized by the formation of an organization of some permanence called "The United States School Garden Army." It was organized in March of 1918 and President Wilson set aside $50,000 from his National Security and Defense Appropriation to promote the work for the next six months. $200,000 has since been appropriated to carry the work through another ten months. The return is looked for not only in the substantial increase which has been made in food production, but also in improvement in the quality of our coming citizenship.

If you have a boy or girl, encourage them to take part in this work. If you have a vacant strip of land which your employes might use,—let them make their spare hours useful. They may find in war gardening the same virtues as do the school children—more food for the world and a step in the ways of good citizenship.

The Municipal Electric Christmas Tree

A famous historian has said that the three great links in binding secure the chain of human helpfulness and cooperation are community of race, community of religion and community of interest. In recent world events it has been shown that the last mentioned of these three great factors in human effort by far outweighs all other considerations. And so in lesser units of human organization the same vital factor is at work.

In view of the approaching Christmastide it is well to call attention to an article that appears on another page of this issue, describing an electrical Christmas tree festival that is each year taken part in by a thriving western municipality. The affair represents in outlay a sum of money so inconsiderable as to make its advent only of passing interest were it not for other factors that go toward the development of a wholesome community of interest and at the same time the planting in the consciousness of all beholders a stronger leaning toward the method electrical in activities of the home and the civic activity of the nation.

To the electrical engineer the idea offers a play for his constructive imagination. To the central station manager an enlarged opportunity for service is given. To the contractor-dealer the selling of the electrical idea to the community as a whole is advanced. But above all a wholesome forwarding of community of interest is brought about that will bring returns to the community and its people an hundred fold.

Growth and Expansion of the Goodwin Plan

Like all other movements that are founded upon broad fundamental principles of cooperative helpfulness, the Goodwin Plan grows and expands in its ideal as month by month passes. Originally it was maintained, for instance, that the contractor-dealer should be the sole and only agent to retail electrical ware. Indeed in the earlier days of evolution in the affairs of the electrical industry this point seemed to be the one great issue between central station and jobber, manufacturer and contractor-dealer.

As time has elapsed it now seems, however, that ideal cooperative helpfulness is to be best gained by limiting the functions of no particular branch of the industry, to fast and iron-clad bounds. The main healing principle to bear in mind is that when one of these branches of the industry enters the activities of the other that the proper differential in prices be observed.

Thus, for instance, in California, where the electrical cooperative movement has taken such a firm hold, it is the policy of the Advisory Committee not to ask or urge central stations to go out or stay out of the business of selling lamps, appliances, etc., at retail to their regular customers. It is, however, the policy to encourage the central station to conduct its selling of appliances, etc., in a manner which shall conform to the business policy of the retail merchants in whatever territory the central station conducts a retail merchandise business. It is also the policy of the committee to help and encourage dealers

to improve their business methods and so to serve the public in the retailing of lamps and appliances that a large volume of the business will naturally flow to them. This policy is followed to the end that these two branches of the electrical industry may both profit to the greatest extent, and that the consumer may enjoy electrical service at the lowest cost consistent with the quality of service rendered.

In its broadest aspects it would seem that it is to the best interests of the industry that all branches of the industry conduct retail departments but that these departments be operated at a profit. While the adoption of this policy which is now being promulgated under the Goodwin Plan will undoubtedly result on the part of central stations and jobbers in a large number of concerns entering the retail field, the proper maintenance of a differential which will ensure a fair profit from the business, will be the best and soundest guarantee of inter-cooperative helpfulness attainable.

Iron Substitutes The Need for the West

The vast mineral deposits and agricultural resources of the West are being searched for possible substitutes for many of the badly needed war essentials. One can hardly estimate the good that is being brought about. Recently it was announced from the laboratories of a prominent western university that a substitute for rubber had been found, which can be made from one of the common weeds of the desert. While the product is inferior to rubber still it will meet many of the conditions of the more valuable product should necessity make its use desirable. New substitutes for various fabrics are being brought to light each month, some of which will put to useful purpose weeds that have formerly not only been of no use agriculturally but in some instances a positive detriment.

In view of the increasing shortage of iron, it is interesting to note that the great asbestos fields of the West may receive an impetus in development.

In this connection progress in Great Britain is worthy of note. In that country, according to the Brass World, a substitute for corrugated iron sheets, composed of asbestos and cement, is now being manufactured. Asbestos is finely ground and freed from extraneous matter. It is then mixed with cement in the proportion of 1 part asbestos to 6 parts of cement, and wetted down to form a mixture. The mixture is passed through a pressing machine similar to a paper-making machine with a large revolving drum, where it is formed into felts or sheets. After being cut to size these sheets are corrugated under pressure, meanwhile care being taken that the tops of the corrugations are as strong as the remaining portions of the sheet. Finally, the sheets are given a seasoning treatment.

Corrugated sheets of the above materials, it is stated, have durability and resistance to climatic conditions, especially in acid-laden atmosphere so detrimental to corrugated iron. The sheets are also fireproof and poor conductors of heat. The use of these sheets in storage battery rooms, where conditions are extremely severe, for partitions, for separating high-voltage apparatus, store partitions, etc., and for cables and even transformer vaults, as well as roofing, seems worth while investigating.

There are known to exist vast deposits of many other minerals in the mountain fastnesses of the West and careful attention should be focused by all upon its commercial and economic development.

The Fuel and Lighting Order in England

A comprehensive document has recently been issued in England on the household fuel and lighting situation. Briefly it allows consumers in dwelling houses a fixed fuel ration, and a supplementary allowance of gas or electricity for lighting, according to the number of rooms occupied, within certain limits. According to the Illuminating Engineer of London, the consumer is at liberty to take this fuel ration, partly in the form of coal and partly in the form of gas or electricity, 1 ton of coal being regarded as equivalent to 15,000 cu. ft. of gas or 800 kw-hr. of electricity.

The lighting allowance varies considerably according to the number of rooms. Thus a person using 1, 2, or 3 rooms is allowed 7,500 cu. ft. of gas and 120 units of electricity, while at the other end of the scale, a person occupying 19, 20 or 21 rooms is entitled to 30,000 cu. ft. of gas and 480 units of electricity. Speaking generally, the order thus bears gently on the small householder, but demands stricter economies from persons with large houses.

One of the most interesting side deductions in reviewing this order is seen in the unconscious relationship between gas and electricity that is thus established. Assuming that these conditions were maintained for California, for instance, we would have on the basis of 500 B.t.u. for every cu. ft. of gas a total of 3,750,000,000 B.t.u. for the first instance cited above, where gas is used. On the other hand the equivalent of 120 kw-hr. of electricity is found to be 409,800 B.t.u. Thus it is seen a vastly greater heating value in the oil is necessary to give out an equal illuminating value when gas is used.

However, where the economy of gas use comes in is due to the fact that the overall efficiency of the modern gas generating plant is vastly superior to the steam electric plant. Hence although greater B.t.u. is allowed at the consumer end of the line, the actual economy of production is within the same order of magnitude for either gas or electricity.

THE NEW JOURNAL SERVICE: Many of the greatest minds of the nation are now engaged in attempting to forecast the trend of coming events of reconstruction in world affairs. No one master mind will, however, be the formulator of these activities or be able to foretell their occurrence with certainty. A million master minds are now pondering these weighty subjects. In so far as these matters affect the electrical industry in the West information is being acquired by the Journal of Electricity, through the helpful cooperation of prominent men of the industry, and the results of this inquiry are each day accumulating in the editorial offices of the Journal. Readers of this magazine will during early issues have for their perusal an interesting series of letters from prominent men in all districts of the West that in the aggregate should prove unusually helpful to the industry at large.

A CHRISTMAS SALE FOR THE KIDDIES

BY W. R. PUTNAM

(Not only is the sale of electrical toys good business from every standpoint, but the education of the coming generation into ways electrical is a matter worth considering. A farsighted idea presented for your thoughtful consideration—and some of the practical ways of carrying it out. The author is well known as sales manager of the Utah Power & Light Company of Salt Lake City.—The Editor.)

ALL THE LADIES IN THE FAMILY CAN COOK THE ELECTRIC WAY

An attractive window featuring toy ranges as arranged by the Utah Power & Light Company. The little table and chairs were used during the sale by two little girlies who "demonstrated" the ranges. Note the Junior Cook Books with the checkered cover.

We are told that the possibilities for the use of electricity are only partially appreciated: that the central station industry, which has grown so rapidly the last decade, is still in its infancy and that it can expect a greater growth during the next than during the past decade.

It is but natural that this growth has taken place during the period that the central station industry has realized the important part that sales activity has taken.

The past two years have been as unusual with the central stations as with other lines of business. We, who are engaged in the manufacture and sale of electricity, have not been able to care for the business offered us; have either been unable to expand or have only taken care of part of the additional business offered us.

This situation will not continue long and we will soon be facing conditions where we will have the usual difficult struggle to secure business.

In studying the present business of the central stations all are impressed with the fact that the residence business is the least profitable of our business and in many instances it is not at all profitable.

In the study of how to increase the business of present residence customers (one result of which study is the present electric range activity of many central stations) we are impressed with the important part that children, with the electric habit, will play in increasing use of electricity in their parents' homes and later in their own homes.

Those central station sales departments which are not very active at present can well devote time now to the electrical education of the children.

The appeal, necessary to secure the children's attention, can best be secured by the use of:

Electrical Toys
Electrical Apparatus for Boys and Girls
Various uses of Electricity in the Schools
Electrical displays for the "kiddies" in the Electric Shops

Electrical Toys —

All boys are especially attracted by mechanical toys and those that use electricity. All electrical shops should take advantage of this situation and at least prior to Christmas have a portion of their merchandising space devoted to a display of toy motors, telegraph sets, wireless apparatus, toy transformers, etc. While we desire particularly to encourage the purchase of toys using our current, we should not ignore electric toys operated from dry cells, as any use of electricity by boys stimulates them to make

THE TEA PARTY IN PROGRESS

These two kiddies were turned loose in the window to amuse themselves to their hearts' content

a further use of this agency which has such an appeal for all boys.

In making a display a special part of the store should be set aside for this purpose and part of the toys should be set up and connected so that the boys can use them.

While some loss is sustained due to rough handling, the results are worth the loss. Very little time need be spent by the sales force in making sales; the toys are almost always surrounded by the boys and every little while you will notice some boy returning to the store with a parent or grandparent who is always greatly impressed with the boy's ability to handle electricity, and as the boy thus proves an efficient salesman, the shop force only need to handle the final sale details.

At the same time that the boys are cared for, the girls should have a department where are shown toy electric cook stoves, 3 pound electric irons, small electric curling irons, tea samovars, etc., that they can use in their playing at housekeeping with their playmates and dolls.

A very attractive set-up for this display is a corner showing dolls at work with these articles. One company has used very effectively in their show window eight or ten girls from the ages of six to ten, who cook electrically and then have a tea party, small tables, chairs, etc., being used. This always attracts attention from the passers-by and results in many sales.

Small boudoir lamps are of especial interest to the girls who are always interested in having their bedrooms as pretty as possible.

The displays, both for the boys and the girls,

THE INDOOR EXHIBIT

A pre-Christmas sale which applied the shop early idea electrically. The table represented an inverted horn of plenty pouring out both useful gifts and toys.

should feature electric lighting sets for the Christmas trees.

Those central stations who have done nothing along these lines in the past have an especial advantage in starting this year, as this Christmas is to be a "useful and a children's" Christmas.

AN ELECTRICAL COMMUNITY CHRISTMAS

(The Christmas of this year is to be a time of deep-felt rejoicing and the community celebration idea is one to appeal to the public. Central stations and contractor-dealers might well combine to formulate a plan and bring it before their respective communities.—The Editor.)

AN ELECTRICAL CHRISTMAS TREE IN PORTLAND

The West is peculiarly fortunate in a climate which makes these outdoor celebrations possible.

With both the timber and the water power in the Northwest, an electric Christmas forms a logical feature of a community celebration. This tree formed part of a past celebration during which garlands and lights decorated the down town district, the five bridges crossing the Willamette River were outlined in electric lights, and various other features made the occasion memorable.

LODI'S MUNICIPAL CHRISTMAS TREE

BY R. C. STONE

(The fact that an enterprising city in the West has made electricity enter into a Christmas Tree festival to a degree that has brought a highly developed community spirit to its citizens and a name for public-spirited enterprise that has gone forth to countless other communities of the nation makes a description of this unique undertaking of vital interest to the electrical industry. The author of this interesting and inspiring article is a well-known educator in the Lodi district who takes an active interest in its civic affairs.—The Editor.)

Lodi, California, is a small city of about 4000 inhabitants, but whatever it has is the best of its kind, and the inhabitants are charmingly loyal. At the close of a banquet given not long ago in celebration of the anniversary of the opening of Hotel Lodi, the handsome, well-furnished, well-managed hotel, unsurpassed in quality anywhere—a shout, as the

THE CELEBRATION

The tree is lighted on Christmas Eve, hymns are sung and candy distributed among the children. The electrical equipment came to about $45.00.

guests departed, announced Lodi as the capital of the world.

Strangers who visit the city join the enthusiastic home people and are everywhere singing the praises of Lodi. Most of all, they love to dwell upon the successful economy of the city government, of the well-filled treasury which enables the Lodi people to enjoy the best of everything.

Perhaps an account of the Municipal Christmas Tree will give the most vivid picture of Lodi's admirably managed public affairs.

Even the Clerk of the Weather, in his way, realizes the value of Lodi's plans for her people, and so manages the weather conditions that the Christmas holidays are bright and clear, just the kind for the full enjoyment of the Municipal Christmas Tree. The financial condition of the city, the $65,000 in the treasury, enables the city superintendent to secure the handsomest tree the state affords. This is the most expensive part of the affair, as the best trees grow in the distant Sierras and the procuring of a handsome tree, fifty feet in height with well-proportioned limbs and perfect foliage, requires good judgment, good planning, properly-directed efforts and a generous supply of money. Yet each year the deed is accomplished, and we rejoice in seeing a stately tree in its place by the beautiful Lodi arch of Mission architecture. From the city treasury come also the means for marvelously attractive decorations. The skillful electric lighting combined with the ideal location of the tree, near a beautiful park and at the intersection of broad streets, gives a perfect view of the dazzling beauty to the thousands who come from homes in the rich surrounding country to take part in the Christmas joy.

The electric lighting is the fairy godmother that makes possible this charming celebration of "the coming of peace and good-will among men." Upon the tree are four lines of lights, twelve tungstens and carbons on each line, and surmounting the whole a beautiful star made of twenty-five amber-colored carbon lights.

The total expense of Lodi's last Christmas tree was $144.00. The electric equipment for the tree with its costs consisted of the following:

AN INDIGENOUS CHRISTMAS TREE

One of the yearly Christmas trees in a daylight view, showing the advantageous situation in an open park. On this occasion a native tree was used.

The main street of Lodi, at the end of which, near the Mission arch, the electrical Christmas Tree is located. Not only is this a community celebration, but the beautiful tree is to be seen from passing trains and brings a Christmas gleam to many who otherwise might have none.

Cost of Electric Equipment for Tree	
Four strings of lights—10 to 12 lamps each	$15.00
Coloring of lamp globes	2.50
50 sockets	10.00
Installation work	2.50
A star made of wood and lighted with 25 amber-colored lamps	15.00
	$45.00

Near the tree is a platform for the band and speakers and the choirs of the different churches. The city band and the choirs provide the major part of the music, but the spectators join in the hymns.

Scattered throughout the crowd, in order that no child may be neglected, are the distributors of candy boxes. The candy and boxes are provided by city funds, but their especially attractive packing and adorning with Christmas ribbons are the work of the Woman's Club of Lodi.

The unmistakable happiness given by the Municipal Christmas Tree at Lodi proves that $150 or $200 of city money is wisely used in this yearly celebration at Christmastide. May Lodi continue the work so well begun.

CHRISTMAS WINDOWS

(The Christmas window is the best salesman the dealer has — and his best advertising space. Here are some practical suggestions covering general principles and specific ideas, for windows which will bring customers into your store. Try some of them out in your Christmas campaign.—The Editor.)

Christmas is conceded to be the time for window displays. Even stores which on other occasions content themselves with a dusty heap of lamp sockets in a speckled pool of red sateen left over from last Christmas suddenly reform and purchasing a few rolls of holly bordered paper, carefully crowd some twenty-five or thirty ornamental lamps into a small window space. Others with more judgment, plan a window campaign, much as they would a broadside of newspaper advertising. So much space—so many days to run it in—such and such articles which they wish to sell—how can the public be reached? Conditions are ideal for the experiment. The public is looking for something to buy, asking to be advised as to what is sensible and worth while. The available space is probably at least 6 by 15 ft.—think of that spread in the daily paper—and color and movement are not barred. The problem, of course, is to make the best use of this opportunity. Every one can advertise, but getting results from advertising is a different matter. The idea is to get results from the Christmas window displays.

The following suggestions are made at random, with no thought of carrying out a connected campaign, but merely as ideas which have been found successful in other fields and which may prove helpful in your store.

A FEW GENERAL RULES, in the first place:

Windows should be changed frequently—if you are in a good location with a live traffic passing your store, it will pay to change window displays every week.

Do not be afraid to put too few articles in your window. In this respect windows are quite parallel to advertising space—it does not pay to crowd them.

Have a plan for your window. A collection of objects which look as though they might have been fired at the window from a shotgun have little drawing power. Just as the artist cleverly inserts lines into his drawing which unconsciously lead the eye to the object he wishes to make the center of interest, so the window trimmer can compel every one who passes his window to look at his feature display if he will use care in the design of his outlay.

Use color — but use it judiciously. Color is the strongest weapon the artist has—it assaults the attention—shouts to the eye—if properly used. Strong colors are good in moderation, subdued colors with a touch of vivid brightness may be just as effective. The appeal here is to think about the colors you use and plan them—not throw in anything in haphazard fashion. Nothing will bring shoppers across the street to look into your window so surely as a well-planned scheme of color in your display—one that attracts and pleases the eye.

Use motion. Electrical toys in motion, electrical appliances in use are far more appealing advertisements of themselves than the same objects at rest. This is a good time for demonstrations.

Do not over-emphasize the background. After all you are not trying to sell a fireplace, with holly wreaths at either end, but the line of electric heaters displayed in the foreground. This is where the artistic plan with a center of interest is of importance. Make the center of interest your electrical idea—not the background.

A MINIATURE LANDSCAPE makes an effective window trimming as a background for small articles. Hills may be built of natural rock or of brown paper cambric loosely fitted over an irregular frame built up of boxes at different levels. In any case they should be liberally carpeted with moss with only an occasional brown spot showing. A cardboard house or two with translucent windows and light within makes an effective appeal for house-wiring as a Christmas gift. Rivers may be made of tin foil, lakes of a mirror, irregularly bordered with moss. An island, a boat or two in proportional size and perhaps a swan might be added.

A miniature landscape in the window of an electric store which makes good use of the moss growing so prolifically in the neighborhood. The store is that of the Modern Appliance Company at Portland.

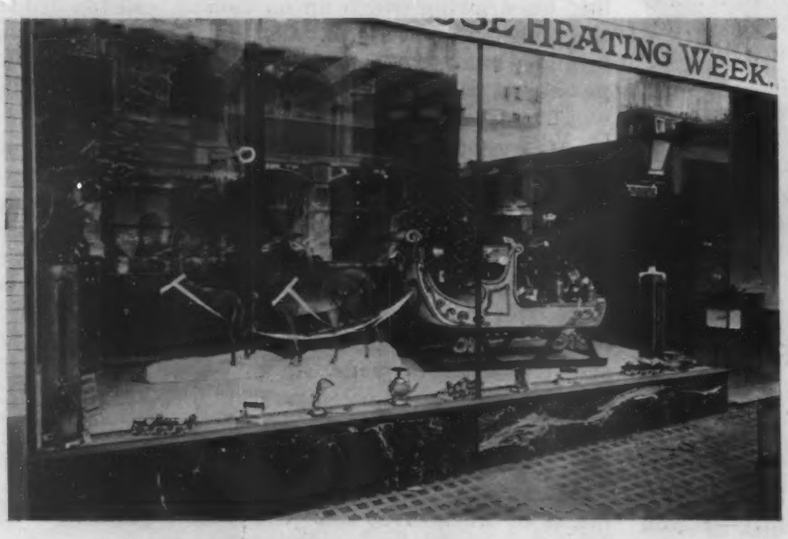
Artificial snow may be had from any store furnishing Christmas supplies or may be self-applied with a generous whitewash brush. This of course, forms an excellent setting for the display of toy trains and like toys and for small appliances which may be nestled into niches in the hillside or scattered over the landscape with appropriate cards.

ECONOMICAL BUT EFFECTIVE

An effective window which shows what can be done in the display of even such insignificant objects as lamps. The mission was built of lamp cartons tinted adobe and brown. Grass sod, geraniums and palms added to the scene. The cost of the entire window was $2.20.

CHILDREN'S ARGUMENTS were used to good effect in one Christmas window which held a special appeal to parents. The cooperation of a nearby school furnished the arguments. The teacher consented to give out as subjects for a composition "Why I would like my mother to have—an electric iron,—an electric washing machine, etc.," and offered a pocket flashlight as a prize for the best. These compositions he pasted as a border around his Christmas window, featuring some of the special arguments on neatly printed cards attached to the article in question.

A LARGE CALENDAR of 1919 can be made to do excellent service by cutting it up and featuring each month against the wall as a poster. From each a narrow strip of red crinkle paper leads to an electrical gift especially appropriate for that month. A large poster in the center of the back proclaims that electrical gifts given now will be of use the year



Christmas scenes may be made most attractive. This entire sleigh and the reindeer were cut from cardboard and painted at little expense. A cardboard house in the rear completed the scene and made a window which attracted passers-by from long distances—and yet which did not subordinate the electrical idea.

round and individual cards for each point out the special uses of that article for the month in question with the added suggestion that it is useful at any time.

SCREENS may be used as backgrounds where the window is not provided with one or where a special effect is desired. By the use of paneled screens with an appropriate wall paper or painted beaver board backing, the impression of a room interior may

THE USE OF SCREENS

A window which shows what may be done with screens as an effective background. If the window has no back wall to shut it off from the store, this is a particularly handy convenience.

be given at little expense. The white enameled finish often used in bathrooms, for instance, makes a good background for featuring either kitchen or bathroom specialties. A most realistic modern kitchen may be set up in this way, advertising ranges, washing machines, irons, dish washers and the like. You will find it possible to borrow plumbing fixtures from any reputable plumbing firm if you will give them credit in your window.

AN EXCHANGE WINDOW is suggested by this last idea. Many furniture stores, for instance, have kitchen furniture which they would like to advertise and might be pleased to feature a model kitchen in their window, giving you credit for range and washing machine, provided you used their tables and chairs for a dining room scene in your display—or vice versa as convenience dictates. There is no need to confine your name to your own establishment. The theory which prompts building contractors to put up their signs on incompleted jobs holds good in this case. Such exchanges might be arranged with stores carrying china, for instance, but no electrical ware. Children's toys might give an added touch to a nursery scene which featured milk warmers, electric pads and the like and offer basis for a like display in a window further down the street. Six repetitions of the name of your store are better than one.

A WELL LETTERED POSTER may itself be the feature of your window and call attention to articles impossible of display. In this case, of course, artistic design and color are of particular importance. Three such posters enumerating gifts for various members of the family might well form a background for one of these father, mother and sister Anne windows which is built with the idea of making gift suggestions.

LITTLE FIGURES OF SANTA CLAUS, about two hundred of them, were cut in silhouette from white paper and scattered over a window in a guessing contest which made a most effective display. The background was solid red, sides and floor and the figures themselves formed an attractive contrast. Each was provided with an electric argument typewritten legibly across it, such as "An electric vacuum cleaner **cleans**," "An electric iron saves steps," "Take life easy with an electric washing machine" and so on. A large poster in the back announced that these figures would be left in their exact positions for three days—that on Wednesday night of that week another figure would be added, not disturbing those already in place, and the first person thereafter to enter the store and correctly point out the new figure would be given a prize. The prize was the only object in the window, other than the figures, and was featured on a red draped pedestal in the center of the space. This not only attracted attention but kept it focused and led people to read the arguments, even making lists of them, in order to identify the new one when it should appear.

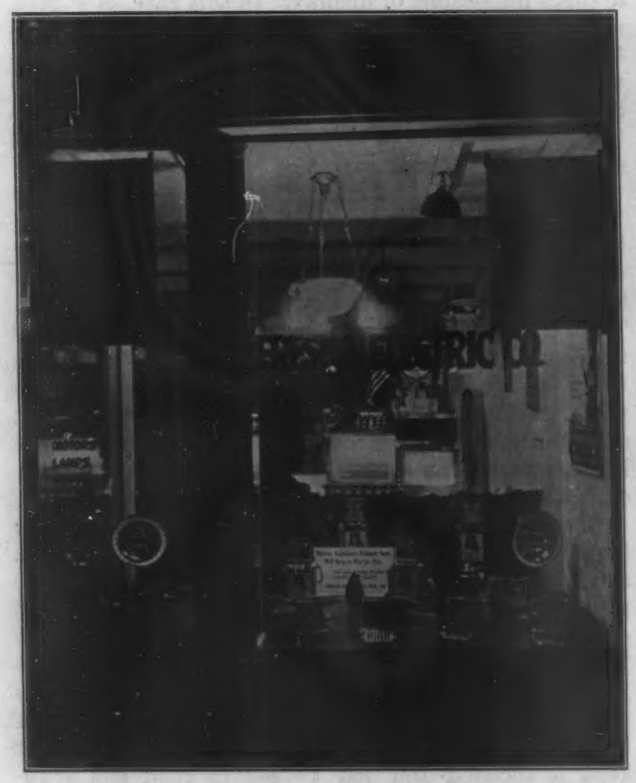
CHRISTMAS SCENES of all sorts, of course, are naturally suggested for window trims. A small Christmas tree, electrically lighted and surrounded by Christmas gifts, will make a most attractive scene. The floor may be covered with a sheet, the tree decorated and the gifts arranged naturally, part wrapped and part unwrapped. Personal messages such as find their place on Christmas presents should show on the labels. If there is some one clever at jingles at hand—a few such on these tags purporting to tell grandma the virtues of her warming pad, or mother of her toaster, will be found to add greatly to the interest.

A fireplace with stockings out of which electric gifts appear (these may be the cardboard reproductions) has similar possibilities. One firm cut sleigh and reindeer out of heavy cardboard and featured a sleigh full of electric appliances as a spectacular display.

The Christmas dinner table, set as it would be in practice with center piece of holly berries and perhaps place cards, gives an opportunity to feature chafing dish, percolator, toaster, dining room bell and the like, as well as bowl and side lights and similar fixtures. In any case, the chief thing to keep in mind is that your window should be built around an idea—and that that idea should be an electrical one.

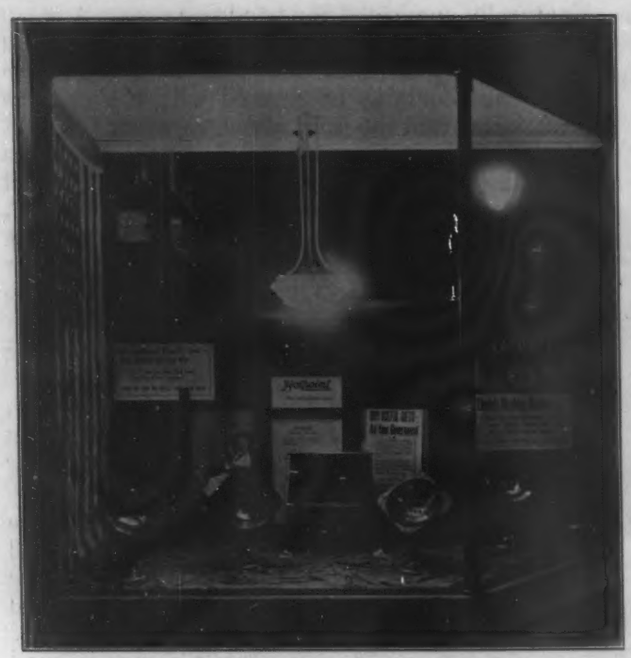
COOPERATIVE CAMPAIGN WINDOWS FOR CHRISTMAS

(A group of early Christmas windows which indicate to what good purpose the San Joaquin Valley contractor-dealers are applying the principles of the California Electrical Cooperative Campaign. An unusually fine series to represent the electric dealers of a city of some twenty-five thousand inhabitants.—The Editor.)



LAMP SOCKET DEVICES

A very excellent window of the Fresno Electric Company, showing a variety of lamp socket devices which the present Cooperative Campaign is endeavoring to introduce to the public. T. H. Curry, proprietor of this rapidly growing establishment, never overlooks an opportunity to acquaint his customers with the latest developments in the way of electric appliances.



HEATING DEVICE DISPLAY

Heating devices are featured in this window display of the Lewis Electric Company. Manager H. W. Lewis is a warm supporter of the Cooperative Campaign and is aiding to further the movement in his newspaper advertising as well as window displays. The results obtained by the San Joaquin Valley Contractor-Dealer Association long ago convinced Mr. Lewis of the merits of cooperation.

A TIMELY WINDOW

When the "flu" epidemic hit Fresno H. H. Courtright, manager of the Valley Electric Supply Company, with his customary enterprise lost no time in telling people of Fresno of the many uses for electric appliances in the sick room. His very complete window display needs no argument.

THE USES OF THE HEATER

A clever idea adopted by the Central State Electric Company calling attention to the many uses that the headlite heater can be put to. Clyde Smith and David J. Robideau, the enterprising proprietors of this establishment, have enthusiastically entered into the work of the Cooperative Campaign and are making excellent use of the window display and newspaper advertising material.

Here's the set-up for the ideal breakfast. Can you imagine anything more complete than this? Everything to please the palate of the most fastidious, ready to be served with the assistance of electricity. Such ideas as this are among the things which make H. H. Courtright, manager of the Valley Electric Supply Company, known for the hearty support he is giving the California Electrical Cooperative Campaign.

A positive record of the highly effective manner in which the electrical contractor-dealers of the San Joaquin valley, and more especially in Fresno, are cooperating with the California Electrical Cooperative Campaign is furnished by the pictures on this page. These enterprising merchants were quick to take advantage of the newspaper and window display advertising matter furnished by the campaign committee, with the result that a spirited rivalry has sprung up among them to produce the most attractive displays. The electrical merchants of Fresno are "on the job" and their progressive and enterprising spirit is reflected in the neat and inviting salesrooms and the high class character of their window displays. They are all agreed that when their windows are used in conjunction with the newspaper advertising, the beneficial effect upon their business is immediately noticed. These dealers are actively tying-in with the California Electrical Cooperative Compaign committee. They are for cooperation first, last and all the time.

Western Ideas

A TACTFUL SUGGESTION from a clerk will often bring about the sale of some article which the customer had no idea of purchasing when she entered the store. The peculiar psychology of the Christmas shopping attitude makes this of particular importance at this time. A woman who is looking for a gift for her husband and does not find the electric heater to her taste, might like the electric shaving cup or instantaneous water heater, or the convenient light for his reading chair. No woman makes out a shopping list at the beginning of the day and ends it without changing some of the items. Others are still more open to suggestion—and do not even make out a list but drift about to see what they can see. Of course, the way this suggestion is made is of great importance. To ask "Wouldn't you like a shaving cup?" opens the way for "No, thank you" as the easiest answer, but if a woman is asked if she has seen those convenient little shaving cups—it is easier for her to look at them than to explain that she hasn't seen them, but hasn't time, etc., etc. The personal experience of the clerk himself or herself who has had experience using the electric toaster and wouldn't be without it makes a tactful introduction—or sometimes an effective closing argument. It might be worth while to use some of the Christmas lists prepared by electrical manufacturers and require your employes to study them. A meeting of the clerks of the electrical dealer's establishment to consider this question would bring out suggestions and experiences which might well prove mutually helpful.

A SIMPLE GIFT FOR THE CHILDREN which can be given away during the Christmas period will help to bring trade to your store and to carry your name into many households. The advantage of children's souvenirs is that they are cherished for many a long day and persist in their advertising powers, whereas an object of the same cost designed for grown ups will soon find its way into the waste basket.

Many manufacturers furnish such gifts at a small price for the electrical dealer's stamp. A simple and effective souvenir, however, can be made at home. By simply folding blank paper of any kind—manila paper or unprinted newspaper will do—into small booklets and binding it with a knot of colored thread at the back, a "Home Electrical" can be made which will not only interest the children, but will set them to collecting advertisements and looking up booklets on electrical subjects. The book should be labeled "The Home Electrical" and should bear the name of the dealer. Within the pages should be labeled Parlor, Kitchen, Bedroom, Bath and the like, but otherwise left blank. Any old catalogues or advertising pages of old magazines which contain pic-

tures of household appliances might be torn out and added with the gift as samples of what might be done. The idea, of course, is for the child to furnish these blank pages with pictures. The ingenious youngster of course will add wall paper samples and parlor sofas—but the suggestion for electric irons and fixtures for the bath room will be gladly carried out. This suggestion might well be more elaborately worked out by a large establishment which wanted to reach the children. The cover could be attractively designed to represent a house and a series of pictures of appliances might be furnished for the child to cut out.

STORE ARRANGEMENT is one of the most important things in the Christmas Sale. Shall the heavy articles be in the back or front of the store? Where would you put the toys and novelties? Are tables good for display purposes? A few of these questions are answered by the following suggestions:

Large appliances, such as washing machines, vacuum cleaners and the like are best displayed near the rear of the store, unless they are being specially featured in a sale. They should be connected up all the time and ready to demonstrate.

Small appliances are best kept in bins. One of each kind on display is ample.

Feature articles, toys and novelties which are not familiar to customers generally should be kept toward the front of the store and connected up where possible. If the boy may make the electric train go himself he will bring his parents back for it—or if father has played with it awhile he may buy it for son.

Tables should be used only where aisles are unusually large. It does not pay to crowd your establishment so that customers have difficulty in making their way down from one end to the other. Small tabarets may be used to hold individual appliances, or these may be displayed on shelves arranged against the wall or around columns.

Do not place your large articles next to small—have some theory in your grouping. It will both improve the appearance of your store and save in time and steps.

Backgrounds are important. Where possible display shining appliances against a dark background, dark objects against a light.

In general display the less well known and less popular goods in the front of your store, the better known in the rear. This forces the public past many an article they would never have thought to ask for and provides against crowding near the doorway, accomplishing the same purpose as the conductor when he calls "Step forward, please."

A bargain table might well occupy the space directly across the back of the store.

A PLACE TO WAIT while the clerk is busy is perhaps a necessity this Christmas with the government's request that no extra help be employed. For this purpose a chair or two in a pleasant corner, near a table on which some of the most enticing of Christmas gift possibilities are spread, might prove of value. A scrap book or two laid ready to hand on this table will induce many a waiting husband or friend to pick it up to read. This should include pictures of the store and especially good window displays of the past, items from electrical magazines which tell of the use of appliances in the home; advertisements or small posters the dealer has used; pictures of installations he has made, or any items of personal or electrical interest which would serve to bring the personality of the store home to the reader. Such a book would prove of value on many an occasion. The dealer in talking to a customer could draw forth his scrapbook and show how the washing machine sold to Mrs. Jones looked in place. Not only would this prove a convincing argument but it would lead to her further glancing through the book. It pays to get the snapshot habit and keep a record of wiring jobs, convenient socket arrangements or efficiently placed apparatus in this way. The customer will be glad to have you take the picture if she knows what it is for—and what is more, will take great interest in looking over your scrap book later.

AMONG THE CHRISTMAS GIFT SUGGESTIONS which may be made to customers, the wiring of the home should not be overlooked. Even in homes where the house is wired for lighting purposes it may be that a convenience switch at the head of the stairs for lighting the hall below or an electric bell at the dining table is the very thing the woman of the house wishes most. Not only should clerks be instructed to bring these suggestions to purchasers, but they might be featured in advertisements and brought to the attention of the public by a poster in the window or on the walls of the store itself. A hint as to the cost of such a wiring job would add a touch of actual possibility to a vague interest and bring many more definite inquiries.

AN ELECTRICAL PICTURE SHOW is unquestionably the most direct way to reach the largest number of people. Both films and slides are to be had from the manufacturers—or you can have your own made at an expense not too exorbitant. A short animated cartoon is very popular with the public and may be made through the cooperation of the nearest film company.

A scene from an electrical Christmas 'movie' which did much to make successful the Electrical Christmas of a year ago.

DON'T FORGET that others will appreciate the Journal of Electricity as much as you do yourself—it makes a most appropriate Christmas gift. Subscriptions may begin with the December 15th or January 1st number.

50 DEGREE MOTOR RATING

(A further analysis of the merits of the new type of motor designed to answer the questions your customers are likely to ask. A questionnaire arranged for the use of motor dealers by one of the large manufacturers of this apparatus.—The Editor.)

Q. What considerations determine the selection of a motor to drive a given load?

A. (1) Power required to start and accelerate, i. e., starting and accelerating torque.
(2) Peak loads—maximum running torque.
(3) Speed regulation required.
(4) Heating of the motor under normal or equivalent load.

It is obvious that

(1) the motor must have sufficient power to start and accelerate its load,
(2) must carry pre-determined peak loads,
(3) must have proper speed regulation to meet the conditions of operation, and
(4) sufficient capacity to carry the imposed load without exceeding the rise in temperature guaranteed when operating continuously at normal load.

Q. Are continuous rated general purpose motors rated according to their load capacity?

A. (1) Yes. The normal rating of such a motor is that h.p. at which it can be operated continuously without exceeding the adopted standard of temperature rise.

(2) The load capacity of a Continuous Rated General Purpose Motor is not exceeded when subjected to variable load, at no time more than 50% momentary overload, if when thus employed its temperature does not rise in excess of that permitted under continuous operation at full rated load.

Q. In the case of a variable load how can the heating effect or equivalent load be determined?

A. By estimate based on a definite knowledge of the character of the load; by the root mean square method; by the application of a motor to do the work and the determination of the temperature rise resulting. It is of course necessary to know the temperature characteristics of such a motor.

The latter method is obviously the more accurate and may well be followed in cases where any considerable number of motors may be required for operating a certain type of machine.

Q. Is it permissible to operate continuous rated motors at sustained overload?

A. No. Continuous rated general purpose motors are guaranteed to withstand 50% momentary overload, but are not guaranteed to carry any sustained overload.

Q. Have the high standards of design heretofore employed been maintained in laying out the continuous rated motors?

A. Yes, strictly. The standardization of a line of Continuous Rated motors has permitted certain justifiable economies in the use of active materials. In no case have these economies adversely affected the operating characteristics or the intrinsic value of the product. No changes have been effected in mechanical design other than those necessary to improve, strengthen or give greater adaptability to the various parts.

Q. Can a 10 h.p. Continuous Rated Motor be substituted for a 10 h.p. motor rated on the basis of 40 deg. C. rise?

A. In a large proportion of applications of general purpose motors, a continuous rated motor can be substituted for a motor of the older rating without difficulty. However, since continuous rated motors only allow for overloads of a momentary nature due precaution must be exercised that the starting or overload requirements, as well as the heating equivalent produced by a known or calculated cycle of duty do not exceed the load capacity of the continuous rated motor. In case the heating equivalent exceeds 10 h.p., based on 50 deg. C. rise, in continuous operation it will be necessary to select a motor of greater horsepower.

Q. Will a 10 h.p. Continuous Rated Motor operate at full rated output be as reliable and durable as a 40 deg. C. rise 10 h.p. motor operated at normal rated load?

A. It has been shown that Class A insulating material, if subjected to a temperature not exceeding 105 deg. C., may be considered as well below the critical point at which treated fibrous insulation deteriorates. Hence the 10 h.p. continuous rated motor operated at full load will show equal life, reliability and operating characteristics as a similar motor of the preceding line.

Q. What essential points should be considered when selecting continuous rated general purpose motors?

A. Care should be exercised to insure that the starting torque and maximum running torque of the motor selected are adequate for the work; that if motors be operated under continuous load, the load does not cause a rise in temperature in excess of the standard adopted.

If subjected to variable loads (not to exceed 50% momentarily) the heating equivalent of such a load must not cause a temperature rise in excess of that permitted for continuous operation at full load.

While the conditions surrounding the installation of general purpose motors are often favorable to "close motoring" (e. g., the ambient temperature may be below basic limits or the average load may be under the normal rating chosen or demanded, thus compensating for occasional peaks), care should be exercised to guard against any duty tending to subject the motor to overloads beyond guarantees, and finally that pulley diameters or gear ratios be carefully calculated. This is a vital essential in certain machines, as for example centrifugal blowers and pumps where increase in load is relatively greater than the increase in speed.

Q. What Continuous Rated Motors are now available?

A. One company has standardized a line of Continuous Rated 50 deg. C. rise direct current motors in sizes up to 200 h.p. It also now has available similarly rated A.C. polyphase motors in sizes 2 h.p. and smaller. Larger polyphase motors will soon be available. A revised line of single phase motors similarly rated is now in preparation.

Q. What advantages does the user derive from the use of Continuous Rated General Purpose Motors?

A. Under the previous method of rating general purpose motors were designed and sold on a basis equivalent to a double rating—this practice resulting in motors being endangered through continuous operation at loads equal to the 25%2-hour overload guarantee. Based on continuous rating, general purpose motors are designed for a definite load, thus permitting the selection of a motor having the proper capacity for a specific purpose. In the larger proportion of general purpose applications where the Continuous Rated motor is properly applied the cost of such a motor will be less than that of one of the older rating. The purchase of a motor is not essentially different from that of any other commodity because a fixed value for a certain price, generally speaking, affords the most exact and satisfactory basis of purchase.

It is customary practice to choose a motor whose rating is in excess of the load to be driven. This practice of "over-motoring" increases the losses and reduces the efficiency of operation. It also increases the first cost of the motor equipment. Over-motoring is the chief cause of the low power factor on many power systems with a large induction motor load. The establishment of a 50 deg. continuous rating for general purpose motors will encourage the selection of smaller motors for general service and thus tend to eliminate "over-motoring" with its attendant excess cost and subsequent inefficiency of operation.

Finally, the continuous rating method promises a better balanced and more homogeneously designed line carried through from the small to the largest sizes, i. e., both A.C. and D.C. general purpose motors of various types will be designed so that the name-plate rating will in all cases serve as an accurate guide to the real load capacity of the motor in question.

SIGNALLING FOR A SEAT

(A really thoughtful service for the comfort and convenience of the boys in uniform which was put into practice by the electrical men of Southern California. Just a sample of how the men at home have been helping. The device is patentable, but the Southern California Contractors and Dealers' Association is not taking advantage of that fact—and will be glad to give details of construction.—The Editor.)

Another war service in the spirit of American loyalty has been rendered by the electrical men of Southern California, a soldiers' and sailors' auto courtesy signal system being erected throughout Southern California by the Southern California Electrical Contractors and Dealers and the electrical industries.

The signals are being placed at junctions of roads leading to the various army and naval bases; at prominent corners in the business district of the various cities and towns and at such other points as will best aid soldiers and sailors to travel about with autoists without expense.

Just pull the string, if you are in uniform, and you get an automobile ride.

Empty seats in automobiles bound towards army and naval bases and from them are almost a thing of the past. Thousands of our fighting men are being moved about without expense. This association found that most of the enlisted men had only a few dollars per month to spend and railroad and street car fares prevented them from visiting points of interest and enjoying vacations during their furloughs and days on "pass." The signals have, in a dignified manner, enabled the "boys" to enjoy themselves while giving autoists the pleasure of contributing to their enjoyment.

The signal system consists of a galvanized metal box open on the front side and painted red, white and blue. The box or "nest" contains from two to four semaphores pivoted near the top to place the heavy weight so that the semaphores sing into the "nest" by gravity. The semaphore arm is attached to No. 12 galvanized wire which is held in place by a guide. The names of the different semaphores are painted on the back of the "nest."

A soldier or sailor desiring to use the signal pulls the semaphore stating his desired destination and holds it in a horizontal position until an automobile stops to pick him up. When he releases the wire the semaphore is "nested." The signals are placed on the side of the street in the direction of travel. They are attached to telegraph poles or street lamps, the latter being preferred as the light at night illuminates the wording.

Placed in main highways at intersecting street car lines enables the fighting man to take a "cross town" car to the main highway and there to quickly be picked up by a passing automobile.

These associations are interlacing all the highways of this section of Southern California.

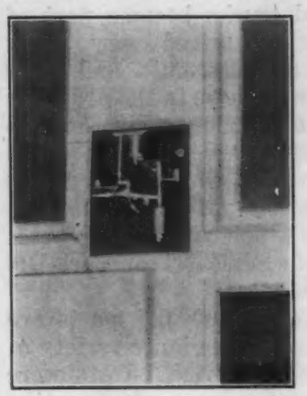
While it is believed by many people that this device is a valuable invention they are not patenting it and will be glad to furnish details to any one who desires to use it for patriotic purposes. The cost figures close to $10 each, erected.

IMPROVING THE FIRE ALARM SYSTEM

BY C. B. MERRICK

(An automatic cutout which does away with false alarms is a real labor saving device—and might be said to have helped win the war. The details of the installation on the San Francisco water front and some of its ingenious "kinks" are here reported by a man formerly connected with the distribution department of the Pacific Gas and Electric Company—The Editor.)

After several false alarms had been turned in from the water front of San Francisco, due to accidental openings of the electrical circuits connected with the fire alarm boxes in this district, an automatic cutout was installed at the Ferry Building by Mr. C. P. Stanton, chief electrician of the Board of Harbor Commissioners, which prevents an accidental false alarm due to the above cause, and yet interferes in no way with the operation of the alarm when a regular box is pulled.

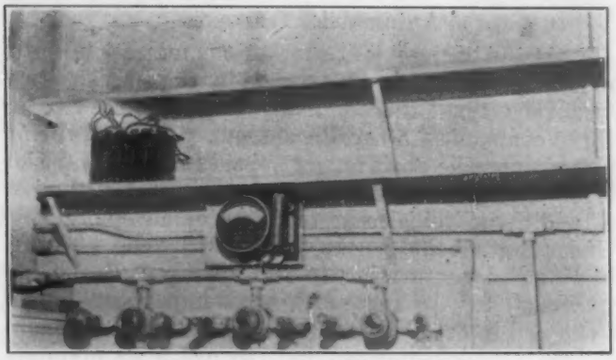


Cutout as actually installed.—Fig. 1

The cutout consists of an operating solenoid and a system of levers and dash pots with a ratchet and lever and a release that can be adjusted for the correct time interval. If the circuit is opened at regular intervals and at the proper rate as sent in by an alarm box, the release remains inoperative and the alarm is transmitted to the outside alarm system. If on the other hand, the rate of opening is irregular, or the circuit is opened only once as in an accidental open, the dash pot system allows the release to operate and the trigger is returned to its normal position.

The photograph was taken of the automatic cutout as actually installed. The main alarm circuit is connected across the gap at the left (closed in the view) while the auxiliary circuit is connected to the solenoid at the upper right hand corner. Opening the auxiliary circuit causes the plunger in the solenoid to drop, raising the ratchet and the toothed bar with it (shown in the center). The bar is held by a catch while the ratchet returns to normal as soon as the auxiliary circuit closes. If the auxiliary circuit is opened again the bar is raised another notch, but otherwise the upper dash pot, after a set time interval, releases the catch and allows the bar to drop to its original position, without having opened the main circuit at the left. By this means, false alarms are avoided and a very appreciable saving made, due not only to avoiding the wear and tear on the fire apparatus, but the additional danger to property which results from having the equipment away from its station.

The convenience of a storage battery as compared with dry cells is illustrated by the other photograph which shows an Edison storage battery, and a part of the shelves occupied by the dry cells it replaced. This battery is used for ringing all bells in the Ferry Building, and is charged continuously by connecting directly across the line in series with the lamp at its left. As the dry cells had to be replaced every three or four months it is a considerable saving of expense to use the storage battery. The labor of charging other sets of storage batteries is avoided by means of time clocks, which are arranged to close the charging circuits for several minutes at intervals of an hour.



The convenient storage battery. The empty shelves indicate the space occupied by the dry cells it replaced.—Fig. 2.

TALK FROM THE BOSS

Up in Canada there is a successful business concern that expects, as most successful concerns do, that every employe shall do his full duty, according to the Houston Post. To assist in the task that concern places conspicuously before him these "Ten Demandments":

1. Don't lie. It wastes my time and yours. I am sure to catch you in the end, and that is the wrong end.
2. Watch your work, not the clock. A long day's work makes a long day short; and a short day's work makes my face long.
3. Give me more than I expect, and I will give you more than you expect. I can afford to increase your pay if you increase my profits.
4. You owe so much to yourself you cannot afford to owe anybody else. Keep out of debt or keep out of my shop.
5. Dishonesty is never accident. Good men, like good women, never see temptation when they meet it.
6. Mind your own business, and in time you'll have a business of your own to mind.
7. Don't do anything here which hurts your self-respect. An employe who is willing to steal for me is willing to steal from me.
8. It is none of my business what you do at night. But if dissipation affects what you do the next day, and you do half as much as I demand, you'll last half as long as you hoped.
9. Don't tell me what I'd like to hear, but what I ought to hear. I don't want a valet to my vanity, but one for my dollars.
10. Don't kick if I kick. If you're worth while correcting you're worth while keeping. I don't waste time cutting specks out of rotten apples.

The young man in business—and no few of the old men as well—can get a good deal of profit from close perusal of these demands of the Canadian firm. A quiet self-examination of himself will develop in his own mind whether he is giving his employer all that employer has a right to expect. And it is a good deal easier for needed reprimands to be self-administered than to come from the "boss."

MOTOR TRUCKS IN WAR TIME

BY CAPT. R. W. A. BREWER

(An interesting account of how shortage in every line from magnetos to tires was overcome and the present remarkable organization of the Motor Transport Service of the English army established. The author is Captain in the British army, formerly connected with the transport service and now on Pacific Coast duty as inspector of munitions at San Francisco.—The Editor.)

Automobile Transport

At the beginning of the war the number of automobile trucks which were owned by the British army was very small indeed, amounting to only two or three companies, a certain amount of reliance being placed upon the government subsidy scheme in order to obtain for government services a certain number of additional vehicles at the time of an emergency. Under this scheme trucks were built by certain firms in England conforming to the government subsidy specification with regard to some important dimensions and in detailed features. Purchasers of a subsidized vehicle were required to make an arrangement with the government whereby in return for a certain annual government payment they would keep their trucks in proper working order and would turn them over to the government immediately upon demand.

At the declaration of war, the impressment of subsidy vehicles occurred, but their numbers were comparatively small so that it immediately became necessary for impressing officers to take all likely vehicles that they could find. These were paid for at the valuation of the army officers, who were detailed for this duty, and where possible, the vehicles were inspected by the inspection officers of the Mechanical Transport Department.

In the early days of the war the great variety of trucks in various stages of degeneration caused enormous difficulties to the officers in charge by reason of frequent breakdowns, so that it became necessary to reduce the number of types so far as possible, when contracts were placed for new machines. As an example of the multifarious collection it is interesting to look at the tire situation where in one warehouse in London, which was taken over by the military authorities, more than 120 different types and sizes of solid tires were kept in stock.

Digressing for a moment to the tire question, it must be remembered that the European truck uses exclusively the pressed on tire, and in service at the beginning of the war the life of a tire was about three weeks, so that it became necessary not only to provide for worn-out tires, but also means for refitting. Much of the tire trouble was also due to the nature of the roads in northern France and Belgium, where the center portion only consisted of cobble stones, there being in many cases a drop of six inches or more on to the dirt road at each side. It will be seen that twin tired wheels in particular running on the edges of a cobbled road like this suffered abnormal wear and tear.

The tire industry also had a great shake-up as the importation of foreign tires, many of which had been used up to that time, stopped and the demands of the army became enormous. As an example of tires held in the base depots in northern France, there lie in one depot under a single roof, 17,000 solid tires and 44,000 pneumatic tires and tubes; at another depot there are four million dollars' worth of tires always in stock.

The magneto question caused serious alarm at the beginning of the war on account of the fact that British built machines, practically universally, fitted German made magnetos. Steps were taken, therefore, to commandeer all the magnetos available in England and elsewhere in order to meet the important demands and give British engineers time to produce magnetos as reliable as those that had previously been purchased abroad.

A branch of the Mechanical Transport Service which has grown to colossal proportions is that which deals in the supply of spare parts and stores for the various trucks, cars, ambulances and other self-propelled vehicles, and this has grown from a diminutive depot called the N. I. V. Stores, originally situated in Aldershot.

When automobiles and trucks became part of the army equipment, they comprised very many almost similar parts, such as bolts, nuts, and other standard engineering details to those in the ordnance stores, but as they were not catalogued in the ordnance vocabulary, it became necessary to equip another store containing articles which were not in the vocabulary. From this has grown the Mechanical Transport Home Depot, which covers many acres in London, and the base Mechanical Transport Depots in France and elsewhere.

In the London depot, over 7,000,000 parts are handled per annum and owing to the large variety of sizes and types of vehicles in service, efforts were made after the war had been progress a few months to bring into line certain parts which could be made interchangeable in the various vehicles; for example, engines, gear boxes, axles and springs, as the spare part question was increasing enormously in difficulty.

Each unit operating in the field carries a certain number of spares on hand, but the sample parts have to be made by the mobile workshops which accompany these units. Two months' supply is carried at all bases. One base alone issued in three years 210,000 items, an item being a number of like parts; in one year that same depot supplied 2½ million parts. In order to provide for the demands made upon it, the stock comprises thirty-two thousand different kinds of parts, consisting of over 2,000,000 actual pieces.

Local repairs to vehicles are carried out by mobile workshops and as each car is overhauled four times a year and there are more than fifty thousand machines in the British service, some idea of the magnitude of the overhauled work can be gathered. Heavy repairs and complete overhauls are made in heavy repair depots, which are fed from the casualty parks. These depots completely rebuild all machines which are not absolutely scrapped, and as soon as finished, the repaired trucks are sent to a reserve vehicle park. One workshop can handle about eighty trucks per week and in the reserve parks vehicles are prepared and equipped for instant service. In one park alone may be found a hundred thousand trucks, three hundred cars and one hundred ambulances.

THE WOMEN IN OUR INDUSTRIES

(The woman question looms large among the problems of reconstruction. But whatever is done by way of readjustment, the change of attitude on the part of both employers and women workers has already taken place and marks a permanent gain. Some record of the situation in the country at large and in the West is to be found below.—The Editor.)

The question of what is to be done when the men return has brought the problem of women's employment again to the fore. A recent survey of the situation in this country appeared in the New York Times which brings up the questions as to what women have accomplished in the war thus far, what new occupations have been opened to them, what new rights as workers by the side of men have been accorded them, what economic gains have been won by them.

As to economic gains, here is a table showing changes in woman's wages in an Eastern metal work plant engaged in the manufacture of war supplies:

	Wages per hour, cents.	
	1915	1918
Foot press operators	17.1	28.70
Trimmers	18.1	28.8
Bench workers	14.05	26
Power press operators	15.7	29.5
Inspectors	16	34.9

These increases are considered fairly typical throughout war industries in which women are employed. Miss Marie L. Obenauer, Chief Woman Examiner of the National War Labor Board at Washington, considered an authority on the subject of women employment, estimates the increase in women's wages in manufacturing war industries since 1915 to range between 80 and 100 per cent.

WAGE RATES OF WOMEN
as compared with rates to men by industries
(Compiled by National Industrial Conference Board)

Classification of Establishments.	Total No. of Establishments.	Wage Rates of Women. Equal to Men's.	Piece Rate Equal to Men's; Time Rate, Less.	Less Than Men's.	Not Comparable, or Not Stated.
Automobile and auto accessories	10	4	1	3	2
Typewriters, other light machines	6	2		2	
Elec. machinery, appar. and supplies	18	3		8	5
Foundry, mach. shop products	37	18		7	4
Munitions	13	5		6	2
Railway equipment	7	6			1
Tools, cutlery and hardware	16	9	3	1	3
Miscellaneous metal products	20	6	7	3	4
Total	127	53	29	24	21

In this table the column headed women's rates "equal to men's" means that rates were the same for men and women, whether on piece or daywork respectively; in some cases women were engaged exclusively on piecework; in other cases on timework.

What is the attitude of employers to the new principle? The National Industrial Conference Board on "Wartime Employment of Women in the Metal Trades" in its most recent research report says: "The principle of equal wages for equal work has found fairly general acceptance among employers in the metal trades." As to the attitude of men workers, this report says: "A large number of employers reported quiet acquiescence or even friendly cooperation of their men. A munition plant employing 694 women found that 'the male workers in the establishment accepted the introduction of female workers in new processes as inevitable, and there was no friction.' * * * Again and again the reported attitude is 'remarkably satisfactory,' 'very favorable,' 'friendly,' or is described by a brief but expressive 'O. K.'"

Women who have won their way in the shops to doing a man's job are being received into unions. Women have been admitted to the International Machinists' Trades, the wireworkers', the ironworkers', and woodworkers' unions.

The increase in the earning power of women since 1915 in work outside the shops, in clerical work and the like, has not been so large, and is estimated to average not much more than 50 per cent, but the whole result is that the American woman has won her way to a new economic footing, and that the basis now recognized is, as defined by the rulings of the War Labor Board, that her pay shall be sufficient to support her and that for equal work she shall receive equal pay.

ATTENDANCE AT WORK
of married women as compared with attendance of unmarried women and men
(Compiled by National Industrial Conference Board)

	Number of establishments	Number of women	Number of married women	Per cent of married women to total number of women.
Women's attendance better than men's	33	4,965	575	11.6
Women's attendance equal to men's	23	3,488	723	20.7
Women's attendance worse than men's	20	7,213	924	12.8
Total	76	15,666	2,222	14.2

What new occupations have been opened to women by the war? Far in the lead are the various machinist trades, hitherto thought alien to them. The progress of women has been from the lighter to the heavier machines.

It is estimated that 100,000 women are employed in munitions plants and airplane factories, as against 3,500 in the last census year. In the chemical plants, on steam cars and electric cars, in elevators, as motor drivers, women have taken the place of men. There is in addition the work of women on the farms and as section hands on railroads.

Of the results found as to output, in the survey of 127 establishments in the metal trades made by the National Industrial Conference Board, this statement is made: In sixty-six establishments, or two-thirds of those furnishing definite information as to output, women's production was equal to or greater than that of men in the operations on which both were employed. In only fifteen establishments was it found that women produced less than men in all operations in which they were engaged. Their production in the remaining eighteen establishments, although less in some operations, was equal, or greater in others.

How many women have been drawn into gainful employments by the war who had hitherto not been so engaged? There are no comprehensive statistics on this, but the consensus among employment experts is that the public has an exaggerated idea of the number of new recruits up to this time. What has given the impression of a vast induction of women into gainful employment for the first time is the extensive shifting, in greater and greater degree, from one occupation to another. From an economic standpoint, the two main factors in this shifting have been better pay and the lessening demand for workers in non-essential industries. The appeal was

OUTPUT OF WOMEN

as compared with output of men in similar work, by industries

(Compiled by National Industrial Conference Board)

Classification of Establishments	Total No. of Establishments	Greater in All Operations	Greater in Some Op's, Equal in Some	Equal in All Operations	Greater in Some Op's, Less in Some	Equal in Some Operations; Less in Some	Less in All Operations	Not Comparable or Not Stated.
Automobiles and automobile accessories	10	1	....	3	1	2	1	2
Typewriters and other light machines	6	2	....	2	....	1	....	1
Electrical machinery, apparatus, supplies	18	2	....	6	2	2	2	4
Foundry and machine shop products	37	12	1	11	1	2	5	5
Railway equipment	7	1	1	1	....	3	1	....
Tools, cutlery and hardware	16	5	2	4	....	....	....	5
Miscellaneous metal products	20	3	2	2	1	....	4	8
Total	127	30	6	30	7	11	15	28

strong to domestic servants, and there was a heavy shift from this employment, and also from lodging house keepers, a calling known as not very remunerative. The vacant clerical positions had to be filled, but, in a considerable degree, this was done by shifting. The pay of women in city clerical positions was a strong inducement to country school teachers and, according to an authoritative statement, 100,000 school teachers have left their schools for new employment. Many nurses also shifted over to new work.

In 1910 8,075,772 women were engaged in gainful occupations, compared with 30,091,564 men. In 1914 the number of women in manufacturing industries was 1,649,697. According to the normal increase of 100,000 a year this would now have reached 2,000,000. The question here is how many women since the beginning of 1915 have been drawn into these industries who had not hitherto been gainfully employed and who, therefore, have swelled the total of women workers? This number is variously estimated at from 400,000 to 1,000,000.

TRAINING COURSE FOR WOMEN EMPLOYES

One of the gains which women may fairly claim as an outcome of war conditions is the recognition on the part of employers that it is worth while educating them in the duties and spirit of their work.

The Puget Sound Electric Traction, Light & Power Company had over 323 men in the service, many of whose positions are being filled by women. The earnestness and seriousness with which these girls have taken hold of their different and difficult new positions has brought forth expressions of appreciation from the management on frequent occasions. They show an apparent desire to know more about the fundamental principles of the business in order that they may develop the highest degree of efficiency, according to the Puget Sound Journal.

For the purpose of helping them obtain a better knowledge of the history of the company, its aims and policies, a meeting of department heads was called by the manager August 9, 1918, to consider the establishment of a school or series of meetings for the purpose of instructing women employes. It was agreed that much good would come from such a procedure, not only to the company, but to the individuals as well.

The department heads designated one person from each of five departments to comprise a special committee to formulate plans and carry out this work, which was to embrace a short course which would bring quick results.

The first course as prepared covered a period of approximately three months, beginning Wednesday, September 4, and ending Wednesday, November 28, a class or lecture being held every Wednesday from 4 to 5 p.m., either in the Meter Room, Sales Department or Accounting Department, as might be most effective for the subject under discussion, a stock of folding chairs making it possible for the audience to be accommodated with reasonable comfort in any one department.

The order of the subjects embraced in the course follows, together with names of the speakers who made the presentations:

First Subject: "History and Organization of the Company," Mr. W. J. Grambs, assistant to the president.

Second Subject: "Generation, Transmission and Distribution of Electric Light and Power," Mr. E. G. Quinan, chief engineer.

Third Subject: "Meters and Service," Mr. R. E. Thatcher, superintendent Meter Department.

Fourth Subject: "Selling Light and Power, Steam Heat and Appliances," R. W. Clark, assistant sales manager. "Rate Schedules, Explanation and Application," J. R. King, industrial engineer.

Fifth Subject: "General Accounting," L. W. Jones, chief clerk, Accounting Department. "Light, Power and Steam Accounting," E. K. Porter, light and power accounting.

Sixth Subject: "Treasury Department Routine and Methods," Frank Dabney, assistant treasurer; E. P. Buck, paymaster.

Seventh Subject: "Purchasing Department Routine and Methods," W. B. Donaldson, purchasing agent.

Eighth Subject: "Railway Department Routine and Methods," F. N. Hamilton, assistant to general superintendent Railway Department.

This limited but somewhat intensive training is not held up as a model course, but the company feels sure from the interest shown and results secured, that a vast amount of short-cut information as to the details of the business can be imparted in htis way, which will greatly contribute to the efficiency of the organization and the smooth working together of all the departments.

AFTER-THE-WAR SHIPPING PROBLEMS

(How are we to reestablish our foreign business—and on what basis is our merchant marine to be managed? The answers to a questionnaire sent out by the San Francisco Chamber of Commerce which takes up a most important reconstruction problem. Answers to other questions included in the questionnaire will be given in a later issue of the Journal of Electricity.—The Editor.)

After-the-War Commerce —

On August 28th, the Foreign Trade Department of the San Francisco Chamber of Commerce sent out 4,000 questionnaires, brought out by Chairman Hurley's letter of August 1st, asking for suggestions as to how best we should prepare for after the war commerce. The Department is highly gratified at the number and character of responses received and now gives a digest of the various replies. The following is a summary of a digest of the replies covering part of the subject.

Ships —

Question 1. Do you consider the Government should continue to own and/or operate our ships after the war or turn them over to companies better qualified to operate them and which are devoted solely to the business of transportation?

Answer: The replies showed strong opposition to Government Operation, only seventeen per cent being in favor. Arguments in favor of Government Operation were based on the apparent inability of private companies to operate in competition with foreign nations, particularly under current laws.

Eighty-three per cent opposed Government Operation for the following reasons:

(A) Because the Government is not as well qualified to operate ships as experienced shipping firms.

(B) Government Operation would eliminate competition.

Question 2. If ships are turned over to operating companies should it be by lease or sale?

Answer: Opinion was divided equally as to whether ships should be leased or sold. Those favoring leasing did so because:

(A) It was feared shipping companies would not be able to raise sufficient capital to purchase.

(B) It was considered doubtful if shipowners could operate under present law without Government assistance of some kind which could best be given under lease.

(C) It was feared the cost of American ships would not permit operation unless sold at a great initial sacrifice, whereas if leased the difference in cost could be written off gradually by the Government, and could be taken into account when making leases.

Those favoring sale based their opinion on a general belief that private companies could better control and operate ships than the Government.

Question 3. Is it not a fact that the large European steamship companies, such as the Royal Mail Line, Hamburg-American Line, etc., were tremendous factors in the development of the foreign commerce of their respective countries?

Answer: One per cent believed Government Operation would be better than by large practical steamship companies.

Ninety-nine per cent believed large companies were a great factor in developing the foreign commerce of other nations qualified as follows:

Because other governments fostered and protected large steamship companies.

Question 4. Would it not greatly stimulate our foreign commerce if most of our ships were turned over to a similar company or companies to operate on regular routes and at regular intervals and whose sailing dates could be relied upon far in advance?

Answer: Ninety per cent believed the larger and faster ships should be turned over to large companies to operate on regular schedules.

Ten per cent believed that Government Operation would stimulate foreign commerce to a greater extent.

Question 5. Are not "Rate Conferences" or "Agreements" for the maintenance of rates an advantage to shippers as well as steamship operators? If such "Conferences" or "Agreements" on the part of American operated ships were under control of the Shipping Board to prevent unreasonable rates, would it not be better than constant fluctuations, unstable rates, vicious competition and possible receiverships?

Answer: Ninety-one per cent believed in "Rate Conferences" where reasonable rates would be established and maintained without discrimination or rebates. Sixteen per cent of these, however, believed the Government should have no control over the rates.

One per cent of these believed that rates should be made in conjunction with other nations.

Question 6. Is it not a fact that "Tramp" vessels should furnish ample competition and protection against exorbitant conference rates without so demoralizing them as to make the operation of regular lines unprofitable and uncertain?

Answer: Seventy-five per cent believed that "Tramp" vessels played an important part in rate protection. Twenty-five per cent did not believe "Tramp" competition amounted to much, being so uncertain and tending to demoralize regular rates and sailings.

Question 7. Should not our navigation laws be so amended as to permit competition with foreign countries and at the same time enable such wages to be paid and such quarters provided as would attract American youth to enter the service?

Answer: Ninety-nine per cent believed present navigation laws should be changed. Some of the suggestions were:

(A) Allowances to mail steamship companies for services performed.

(B) Making uniform laws with other maritime nations.

(C) Government to offset in some way difference in cost of wages and operation.

Digest of All Replies —

Taking all replies as a whole the consensus of opinion seemed to be:

That the Government should continue to own, for a period at least, but not to operate the ships. That they should be turned over under leases which would be made to offset difference in cost of construction and operation with the possible privilege of purchase. That large companies such as used to be operated by European nations were highly essential in handling the larger and faster ships on regular schedules—such companies to be encouraged and fostered by the Government. That rates should be agreed upon and established in conjunction with other maritime nations and be strictly maintained without discrimination or rebates, but without Government control. Leases to prohibit, however, exorbitant rates or discrimination. That the smaller and slower vessels might be handled as "Tramps preferably by shipping companies, but so controlled as not to demoralize or discourage established rates or lines. That the navigation laws of the United States should be changed to enable American ships to operate in competition with those of other nations and at the same time provide for such wages and quarters as would tend to attract and encourage American boys in seeking a career on the sea. That the Government in some way should offset existing differences by other nations by mail subsidy, allowance in leases and/or other means.

Ports and Proper Port Facilities —

Question 8. Should not the ports of the United States be improved by providing ample docks, warehouses adjacent thereto, convenient rail connection and mechanical appliances for the speedy and economical handling of cargo both in and outbound?

Answer: Unanimously in favor of ample docks, warehouses and mechanical appliances for handling cargo. These expenses form a part of overhead expense and unless cargoes can be promptly loaded and discharged at minimum cost will materially handicap our ships. All the large ports of Europe are well equipped and it is due to this in a large measure that their commerce increased. Ports which become congested tend to divert ships.

Question 9. Should not "Free Ports" or "Free Zones" be provided at suitable points to encourage the trans-shipping business, to enable goods to be brought in, traded in, sorted, conditioned, mixed, etc., without being subjected to the present customs red tape, thereby attracting both commerce and foreign ships?

Answer: Unanimously in favor, many believed trans-shipping business would constitute a large part of the future commerce and that "Free Ports" were absolutely necessary. Such ports served to build up many of the leading ports of the world.

Question 10. Should not the port charges and customs of the various American ports be made as reasonable and as uniform as possible?

Answer: Unanimously in favor. Some considered ports were just as competitive as steamship lines and all charges and customs should be as low as possible.

Question 11. Should not trade routes be designed with the "Hub" idea so that commodities, on account of a constantly active market, cheap handling, efficient technical grading, specialized market outlets for resale through highly efficient import and export houses would be attracted from all markets to be reshipped out again from American ports to other overseas markets, as has been a big percentage of London's and Hamburg's business?

Answer: Unanimously in favor, but a few thought American shippers and ship owners would work this out themselves and that Free Ports would tend to develop this.

Digest of All Replies —

Taking all replies the opinion seemed to be that the ports and their facilities of the United States, as a rule, were entirely inadequate for a very large expansion in foreign trade. That in order to compete with other nations proper docks, warehouses, loading and discharging appliances should be ample and of the most modern type, as ports were just as competitive as steamship lines, railroad lines, etc. That to utilize the vast Merchant Marine being built, special efforts would have to be made to secure a large amount of trans-shipment tonnage which could only be done with a system of Free Ports. That the large European ports owed their growth and prosperity very largely to the facilities and low cost of handling they afforded.

Banking, at Home and Abroad —

Question 12. Is it not vitally essential that American banks be provided in foreign countries? Do you consider this can best be done by the Federal Reserve Bank, or by individual banks, or by combinations of national banks?

Answer: Seventy per cent favored American banks, either combination of national or individual banks.

(A) Because the resident managers would have more liberty of action and seek trade.

(B) Because they would encourage investment of American capital.

(C) Because European banks in foreign countries while controlling the finances exerted a considerable influence in favor of the merchants of their own nation.

Thirty per cent favored the Federal Reserve Bank establishing branches in the leading cities of the world.

(A) Because they were more apt to give the same service to all.

(B) Because they could operate on a smaller margin.

Question 13. Do you not believe some arrangement should be made whereby local banks can realize, through re-discount at Federal Reserve Bank, on advances made to shippers on documents, and not necessitate the local banks carrying this burden during the time required for collection? Would not such an arrangement give a much greater leeway to the local banks and, in consequence, facilitate such transactions?

Answer: Unanimously in favor for the following reasons:

(A) Because it would go a long way to strengthen the importer and exporter.

(B) Because it would enable home banks to carry these accounts in larger quantity. The foreign customer must be given reasonable credit and this was an excellent means of providing for it without curtailing the credit of either the exporter or the local bank.

Digest of All Replies —

It was the concensus of opinion that one of the principal requirements for enlarging our foreign trade was the establishment of overseas banks in all the principal cities of the world, whether they were National Banks or Federal Reserve Bank Agencies, Trust Companies or Private Banking Institutions operating with American capital. That European nations could trace their prosperity to the fact of having their own banks in foreign countries.

A METHOD OF SHIP WAY ILLUMINATION

BY F. D. WEBER

(The temporary character of the ways and the extreme flexibility required of the illumination make the problem of efficiently lighting ship ways one of some difficulty. Here is an effective system as worked out by the Northwest Steel Company of Portland. The author is chief electrical engineer with the Oregon Insurance Rating Bureau.—The Editor.)

The following method of illumination is in operation at the present time at the plant of the Northwest Steel Company, Portland, Oregon — the system being installed by the M. J. Walsh Company.

One of the most difficult problems in illumination is offered by a modern steel ship on the ways. This is due to several reasons, which are as follows:

First—The electric system is subject to the most severe mechanical injury, such as falling steel plates, angle irons, etc.

Second—The temporary character of the ways themselves.

Third—The necessity of having the system extremely flexible, as the demand for light in various locations is constantly changing.

The system that is in operation at the Northwest Steel Company's plant was designed with the above points in mind.

Upper Level Illumination

The upper level illumination is accomplished by the use of an adjustable fixture. This fixture is a goose neck fixture 20 feet long, constructed of 1¼ in. pipe, equipped on the upper end with a Benjamin Reflector No. 6129 and a 1000 watt lamp. This fixture is raised and lowered by means of two single pulleys and a ⅜ in. rope. A piece of Brewery cord is used to connect this fixture to the conduit system.

There are two of these fixtures on each side of a way.

To serve these lights, conduit is run down each side of the ways with three No. 6 B&S gage wires for service, which feeds seven of these fixtures. The distance is 400 ft. These service wires enter iron cabinets mounted on the scaffolding. From each cabinet ¼ in. conduit is run as near to the fixtures as possible. Then the Brewery cord is used to make the flexible connection.

Midway Level Illumination

This consists of 13 Benjamin angle reflectors No. 5537, equipped with 500 watt lamps, for each side of a way, all of the wire being run in conduit up to the angle reflector, from iron conduits.

Lower Level Illumination

Thirty-seven 60 watt lamps are necessary, attached to weatherproof sockets which in turn are attached to a Type "C" condulet. This illuminates one side of a way on this level.

On top of the crane towers there are installed two 1000 watt flood lights of the X-Ray No. 90 type.

Portables

On each side of each way there are 32 plug boxes with 8 weatherproof receptacles in each.

These plug boxes are constructed as follows: A board 2 in. thick is treated with compound to make it weatherproof. Holes are bored the exact size of a weatherproof receptacle in same. Then the outside of the weatherproof receptacles are slotted in three places and steel pins driven in these slots when the receptacles are placed flush in the board, in order to keep them from turning in the hand. The back of the receptacles is poured full of battery compound. Over the compound a ¼ in. board is placed.

A single pole Edison fuse is placed in the center contact of each receptacle and the receptacle is so wired that the shell is dead; this being done so that workmen on the steel boats will not get shocked when disconnecting a plug.

Sixteen of these plugging boxes are strapped 5 feet from the ground and 16 are strapped 40 feet from the ground.

These boxes are each fed by ¾ in. conduit with 2 No. 8 B&S gage wires in each.

Hull Feeders

These consist of seven sets of 3 No. 8 B&S gage stranded rubber covered wires to which is attached 70 Benjamin reflectors No. 5402, equipped with 300 watt lamps each. These are protected by a special guard of No. 9 iron wire.

Plugs Inside Hull

The plugs consist of 42 weatherproof receptacles used for plugging in extensions. The wires serving these are tied to special holes in the steel beams of the hull, and a No. 14 wire is put between the ribs and plates for other suspension points. Circuit-breakers of porcelain are used in all tie wires for insulation.

Main Service Feeders

The main service feeders for each side of the ways consist of 3 No. 00 B&S gage rubber covered cables.

SAVING THE WASTE IN PENSTOCK PIPE DESIGN---II.

BY B. F. JAKOBSEN

(The scarcity of material persists as a reconstruction problem—and its economy through the proper balancing of elements in penstock design as pointed out below is a matter of considerable importance. The first article on this subject appeared in the issue of November first and is preliminary to the discussion here given. The author is a well known consulting engineer of Berkeley and San Francisco.—The Editor.)

The use of equation (1) is not limited to sections of steel penstock, but it should be used to determine the relative sizes of the various parts of the entire water conduit from the intake to the power house, as far as operating and construction conditions will permit. Where ditch and tunnel construction is employed, it may not be possible to make k the same for both, since a tunnel has a certain minimum size corresponding to minimum cost and it

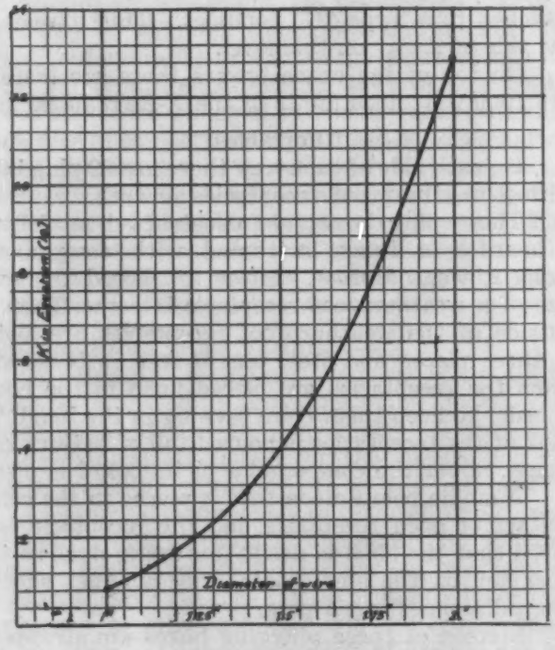


FIG. 3—VARIATION OF K WITH DIAMETER OF WIRE FOR CONSTANT CURRENT—Eq. (18)

p = .30 dollars
i = .10
I = 1000 amperes

may be that this size is larger than needed. In such a case the flow should be increased, if possible, as there is no other remedy.

When comparing open ditch construction to any closed conduit type of construction by equation (1), the fact that the closed type of conduit saves head at part load and therefore conserves water, should be given such weight as it may have in each particular case.

Equation (1) is also available for proportioning transmission lines. Let the cost installed be proportional to the weight of copper and the loss inversely proportional to this weight, and let:

D = diameter of conductor in inches;
w = weight of copper conductor in pounds per foot;
p = price in dollars per pound of conductor; then:

$$w = 3.86\ D^2\ 0.785 \text{ pounds}$$
$$c = w\ p\ i = 3.03\ p\ i\ D^2 \text{ dollars} \quad \text{.....(14)}$$

I = average annual current in amperes;
r = resistance in Ohms of 1′ of wire of dia. D inches; annealed wire at O°C.

$$r = 7.6\ 10^{-6}/0.785\ D^2$$
$$= 9.65\ 10^{-6}/D^2 \text{ Ohms} \quad \text{.....(15)}$$

The annual loss of power through this one foot of wire, is:

$$L = 8760\ I^2\ 9.65\ 10^{-6}/D^2 \times 746$$
$$= .000113\ I^2/D^2 \text{ hp. hr.} \quad \text{.....(16)}$$

From (14) and (16) by differentiating with respect to D:

$$\Delta c = dc = 6.06\ p\ i\ D\ dD \quad \text{.....(17)}$$

and $\Delta L = dL = -.000226\ I^2 dD/D^3$

and, neglecting the minus sign:

$$K = \frac{\Delta c}{\Delta L} = 26{,}800\ p\ i\ D^4/I^2 \quad \text{.....(18)}$$

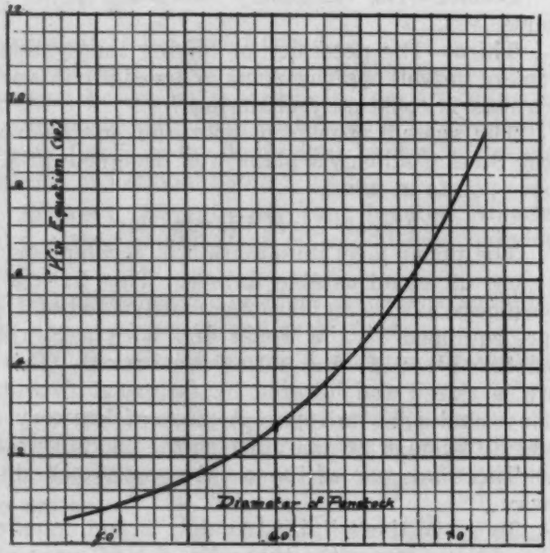


FIG. 4—VARIATION OF K WITH DIAMETER OF PENSTOCK FOR CONSTANT FLOW AND HEAD, Eq. (19)

i = 16
p = .15 dollars
h = 200 ft.
s = 12,000 No. 1 sq. in.
g = 300 cu. ft. per sec.
e = 0.72

K in formula (18) denotes what the cost is for the last increment of power obtained by using a wire of Diameter D instead of a slightly smaller wire. This K should be less than the price of power at the substation and if D is made larger than this economic limiting value, the power thus gained costs more than it brings. Voltage regulation may, however, demand a larger D than economy dictates.

From (18) it is evident that for maximum economy the area of the wire must vary as does the current, or the current density must be constant.

The relation between the values K from (6) and from (18) is evident. It is clear, then, that for any given plant and conditions, the amount of capital which should be spent on the water conduit bears a certain definite ratio to that which should be expended on the transmission line copper in order to get maximum economy with the money expended.

In equation (18) K is the annual cost in dollars per hp. hr. of power increment for any length of line (and any number of wires), since both c and L are directly proportional to the length. The following table shows the relation between K and D, when $p = .30$; $i = .10$, and $I = 1000$ amperes:

D	Eq. (18) K in cents	Amps./sq. in.
1.0″	.0804	1274
1.2″	.1665	886
1.4″	.3085	651
1.6″	.5260	498
1.8″	.8420	394
2.0″	1.285	318

The variation of K with the size of conductor is shown in Fig. 3.

Therefore, with the above constants, and if $D = 2''$ it would cost 1.285c annually to gain an additional horse power hour annually by enlarging the wire, whereas if $D = 1''$ is would cost only .0804c.

Combining equations (6) and (12) gives:

$$K = \frac{316\ i\ p\ \sqrt{a}\ R^{0.827}}{.000105\ s\ q^{2.85}\ e} \qquad (19)$$

where K is in cents per hp. hour of power increment at the substation switchboard. With the constants as given above for the penstock, i. e., $i = .16$; $p = .15$; $q = 280$; $s = 12{,}000$ and with $h = 200'$ and $e = 0.72$ the following table shows the relation between R and K for the penstock:

R	Eq. (19) K in cents	v
2.4′	.0576	15.4′
2.6′	.0994	13.1′
2.8′	.165	11.7′
3.0′	.267	9.9′
3.2′	.407	8.8′
3.4′	.626	7.7′
3.6″	.938	6.8′

The variation of K with the diameter of the penstock is shown in Fig. 4.

Therefore when $2R = 4.8'$ it would cost 0.0576c annually to gain an additional hp. hr. per year by increasing R, whereas if $2R = 7.2'$ it would cost 0.938c per additional horse power hour.

K in (19) should, of course, be smaller than K in (18), since the latter includes power house production charges while the former does not.

The above formulas determine the manner in which the available money should be distributed among the various items in order to get maximum economy with the money expended. If the water conduit consists of ditch, tunnels, wood stave pipe and steel pipe, equation (1) will give the economical proportion of all these sections, because for maximum economy k should be alike for all, or as nearly alike as construction and operating conditions will allow.

These formulas do not give any information as to how high it will pay to go with k or K for each power plant. That depends upon many things, as for instance the price of material and labor, what power is worth, how extensive the market is, future conditions, etc., and last, but not least, upon the amount of money that can be obtained for construction.

Equation (1) will apply to every part of a power system of which the loss of power depends upon the cost in such a manner that increasing the one decreases the other and such that k and K increase continuously, as in equations (12) and (18).

WATER POWER IN INDIA

A recent article in The Electrical Review of London gives a survey of the power situation in India. The power problem here is in general complicated by the urgent necessity for conserving as much water as possible for irrigation purposes. Over the greater part of the country there are few perennial streams, and storage reservoirs for conserving the high rainfall of the monsoon season would be necessary. Many of the elevated valleys of the Ghats lend themselves to the construction of storage reservoirs, and a very large proportion (up to 90 per cent) of the rainfall may be collected and stored. The Tata Hydroelectric Undertaking receives its water supply from three such valleys. The total catchment area is only 22 square miles, but this is sufficient to give 100,000 e.h.p. for 3600 hours per annum. Other projects of a similar type are under investigation in the Western Ghats. It is estimated that a continuous 300,000 e.h.p. may be obtained from the Koyna River alone; that 100,000 e.h.p. may be obtained from each of the rivers Vaiturna and Kali Nadi, and from the Andrha Valley; that a continuous 20,000 e.h.p. is available at Kali Nadi, Gersappa and Lushington Falls, and that, by a combined system of storage reservoirs suitable also for irrigation purposes, a continuous 50,000 e.h.p. might be developed from this system.

The northwest corner of the United Provinces would also appear to be a promising locality for early development. At present the erection of a generating station on the Jumna is under consideration. From 40,000 to 50,000 h.p. can be easily and economically developed on the rivers Jumna and Tons, and as this region is thickly populated, there would be immediate markets for energy for the operation of cotton, rice, sugar, flour, oil and saw-mills, and for other industrial undertakings.

There are also known to be many promising sites in the Central Provinces.

In the Mysore the very successful government undertaking on the Cauvery River has a capacity of 22,000 n.h.p. The power is transmitted some 90 miles to the Kolar gold fields and to Bangalore and Mysore, respectively 57 and 37 miles distant.

In the Native state of Kashmir an installation on the Jhelum River at Mohora is designed to develop 20,000 h.p., and transmits its power to Baramula and Srinagar.

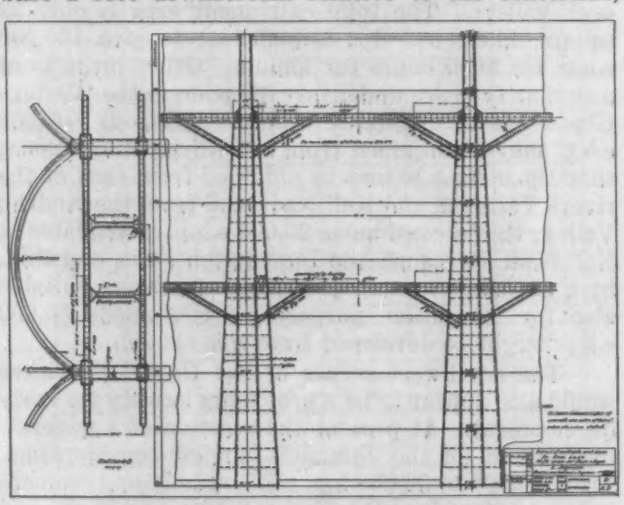
In general the hydraulic possibilities of India appear to be very great. The country possesses in abundance the minerals necessary for metallurgical development, the climate and land for the cultivation of cotton, flax, jute, and many other commodities, and an enormous population which, if trained, would provide skilled labor. It is certain, too, that the demand for nitrogenous fertilizers will be enormous.

CONSTRUCTION FEATURES OF A MULTIPLE ARCH DAM

BY L. R. JORGENSEN

(For locations in which an earth dam is out of the question, the multiple arch dam is in many cases being used. The ability to accurately figure stresses and prophesy strength in advance is one of the great advantages of this dam over any form of earth structure. Some of the details of this process are here considered by an engineer who is intimately familiar with multiple arch dam construction.—The Editor.)

Some difference of opinion may well exist as to what is the actual stress per square unit of area of the buttress at any horizontal elevation. The loads per buttress are given on the diagram. Take, for instance, at elevation 80, the vertical load is seen to be 4977 tons, and the horizontal load 4000 tons. As the horizontal area is 360 square feet, the unit vertical stress should be $\frac{4977}{360} = 13.82$ tons per sq. ft., or 192 pounds per sq. in. The shear would be a little more than friction alone would take care of, but steel is provided for the remaining. The resultant of the two (horizontal and vertical) forces intersects the base 2 feet downstream relative to the centerline,



THE REINFORCED STEEL CONSTRUCTION

The triangular steel construction ties the adjacent arches into the buttress. Should one arch fail this triangular girder would prevent adjacent arches from collapsing.

but on account of having the counterfort (20 sq. ft.) on this side the centerline also, the stress is actually uniformly distributed. Now if instead of the two principal forces, their resultant is used, assuming it acting on a number of steps perpendicular to the direction of this force (the resultant), the apparent unit stress will be much higher. Thus the resultant (6384 tons) acting on an area equal the sum of all the steps ($360 \times \sin 51° - 13' = 280$ Sq.) will produce a compression equal to $\frac{6385}{280} = 22.8$ tons per square foot or 317 pounds per square inch.

There is a large difference between 192 pounds per square inch and 317 pounds per square inch. The actual unit compression will be lying somewhere in between these two limits, and the following formula (which can be found in some handbooks) gives the maximum stress on any horizontal plane more definitely:

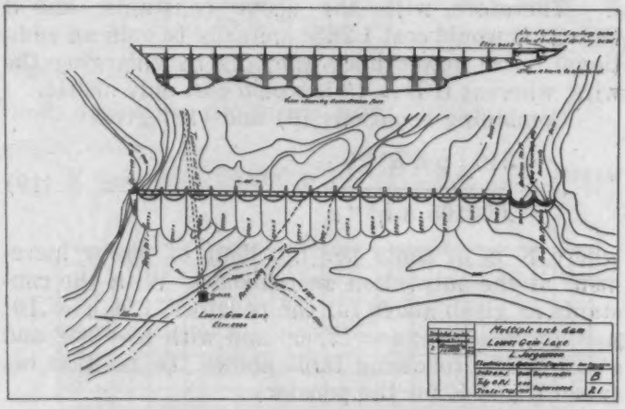
$$\text{Ideal max. stress} = \frac{m+1}{2m} \times \text{unit vertical compression} + \sqrt{(\text{unit vert. comp.})^2 + 4\,(\text{unit horiz. shear})^2}$$

(m = Poison's ratio = 5 for concrete.)

Then at Elevation 80,

$$\text{Ideal max. stress} = 0.4 \times 192 + 0.6\sqrt{192^2 + 4 \times 106^2} = 76.8 + 171.6 = 248.4 \text{ lb. per sq. inch.}$$

The unit stress produced by the normal component of the arch thrust on the buttress is greater



DESIGN FOR DAM AT LOWER GEM LAKE

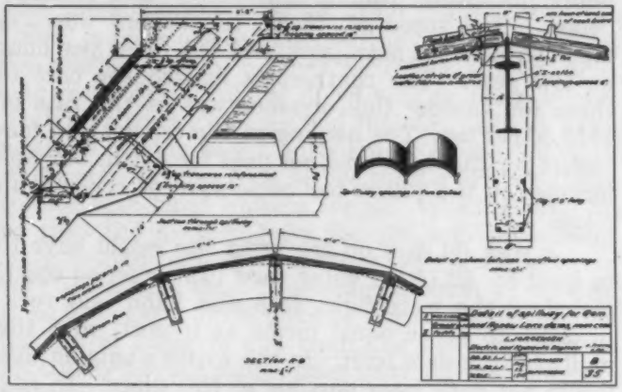
The outlet works are here indicated, consisting of a concrete chamber and a steel pipe laid through a tunnel for a distance of 300 ft.

(348 lbs. per sq. inch) close to the foundation, than the max. stress produced by the resultant (317 lbs.), but at the foundation there can be no column action, and a fairly high unit stress is therefore safe.

The reinforcing steel embedded in the buttress is put there for different purposes. Along the upstream slope the triangular steel construction shown in the accompanying figure ties the adjacent arches into the buttress. This is desirable on account of the fact that in order to facilitate construction, the buttresses are built first, and later the arches. The hooping that interconnects the different bars is simply left protruding through the concrete of the buttress at the time this is built. Should one arch fail this triangular girder would immediately take up the unbalanced thrust and prevent adjacent arches from collapsing, and this is its principal duty. Besides this, however, the steel is active in preventing cracks in the buttress and in taking up some shear. Towards the downstream edge of the buttress four vertical rods are embedded in the concrete for the purpose of stiffening the same, preventing cracks and taking care of wind pressure. Towards the middle portion reinforced counterforts are constructed for the same purpose. These are still more effective between the pairs of steel rods. All ma-

terial in the counterforts supports load the same as the buttress itself, but they are at the same time most effective in stiffening the large flat slab (buttress) so that fewer struts are required.

Towards the top of the buttress (at elevation 15) two horizontal struts are tied to the vertical reinforcement (see figure). These two struts are so designed that besides their main purpose of holding the upper portion of the buttress in place, they are capable of supporting a light roadway above them. At elevation 45 another strut is located near the upstream face, mainly in order to support the triangular girder, should this latter ever be called upon to support any unbalanced arch pressure. All



DETAILS OF CONSTRUCTION

Spillway reinforcement and details showing openings and column support. Leather strips are used at the timber joints if great water tightness is desired.

struts are able to withstand tension as well as compression, as can be judged from an inspection of the details.

The design shown in these illustrations was made by the writer for the Pacific Power Corporation, of Bodie, California, to be used for the construction of their new Gem and Agnew Lake dams, situated on Rush Creek, Mono county, California. The line drawing is a plan view of the Gem Lake and dam site. Here also is indicated the outlet works, consisting of a concrete chamber provided with a row of iron bars in front, and a 48 in. diameter steel pipe laid through a tunnel for a distance of approximately 300 feet. This pipe line terminates in a power house located 1808 feet below (in elevation) the top contour of the lake. The maximum height of any individual arch of this dam is 84 feet, and the vertical distance from the deepest point in the foundation to the crest is 112 feet. The length across the dam site at crest elevation 9053 is 700 feet. The reservoir created is of 17,000 acre feet capacity, capable of regulating Rush Creek to yield an estimated average flow of 45 second feet. The drainage area above the dam is 22½ square miles, and is located on the eastern slope of the Sierra Nevada mountains, between elevations 9,000 feet above sea level at the dam, and 12,000 feet along the crest of the mountains. The precipitation at these elevations is still high, but decreases very rapidly from the foot of the steep mountains out over the desert situated immediately east at elevations ranging between 6,000 and 7,000 feet above sea level.

The rock at the dam site was, for the most part, exposed bedrock worn clean by glacial action. Some excavation was, however, necessary in the stream bed and through a rock slide at the northerly abutment. The building material for the dam was found near by—the sand along the shore of the natural lake, while the rock had to be hauled a short distance on a tramway, first from the outlet tunnel dump (limestone), and later from a large rock slide (granite) about 2,500 feet away. All available material in the neighborhood, especially the different sand deposits, were tested before any particular material was decided upon for construction. It was found that the sand deposit along the shore of Gem Lake was good, and therefore used. This sand was first pumped, and later shoveled from the lake and transported to a storage pile near the mixing plant. This lake sand, which contained 3½% of dirt, was mixed with this sand from the rock crushers (all particles below ¼ in. size) in the proportion of about three-fourths of lake sand to one-fourth of crushed rock sand. This gave a very good combination both as to strength and water-tightness.

Compression tests on 6 in. cylinders were made as construction work progressed, using Bear Brand of Portland cement, Gem Lake sand, and crushed rock in the proportions 1:2:4, and averaged about 900 pounds per square inch for crushing at the age of 14 days.

A 1:2:4 mix was adopted for the arches and struts, and a 1:2½:5 mix for the buttresses. The actual proportion, however, was sometimes changed, but 1½ barrels of cement for the arches, and 1¼ barrels for the buttresses was used always. The rock was crushed in a gyrator crushes, and separated into three sizes through a revolving screen having 1½ in., ¾ in. and ¼ in. meshes. The rejects from the screen went into a jaw crusher, the jaws of which were set to give a 2 in. maximum size rock.

The distribution of the concrete to the different arches and buttresses was done by means of two wheeled push carts and short chutes.

During the construction period in the summer of 1915 and 1916, tension tests were made of cement briquettes in a small field laboratory. Much attention was also paid to the sand used, and 1:2 and 1:3 mortar briquettes were tested frequently, and silt analyses were made as the work progressed.

The reinforcing placed in the dam consists of high carbon steel bars, either corrugated or twisted. The position and details of these bars is fully shown in the different views, and no further explanation need be given.

For form lumber the trees standing on the reservoir site were cut down and sawed into lumber in a mill erected on the ground by the contractors. Large cone bearing trees can be found in this neighborhood up to elevation 11,000 in fairly large quantities, but not of the best quality. The lumber proved to be good enough for form work, was used green, and on that account ¾ in. by 4 in. battens were placed on the under side of the sloping arch to avoid leakage of grout between when shrinkage took place. These battens also helped to give an even circular

shape to the outer ¾ in. by 12 in. boards, constituting the form for the downstream face. This sheeting was supported on 2 in. by 6 in. studs spaced 2 ft. 6 in. apart, toe-nailed on to the wooden arch trusses. These trusses were spaced 5 feet apart in elevation, and a little over 6½ feet apart measured along the arch slope. The formwork for the upstream face consisted also of ¾ in. by 12 in. boards nailed to 2 in. by 6 in. studs, which in turn were nailed to circular boards at spaced intervals. This outside form was held away from the inside form (downstream side) by means of wooden distance pieces of the proper length, which pieces were removed just before the concrete reached them.

A 1:2 plater coat of cement mortar was put on the upstream face by means of a cement gun, ¼ in. thick at the crest, and increasing to ¾ in. thick at elevation to 80 feet below.

Some tests were carried out in the laboratory of the University of California of the watertightness of plaster "shot" on the dam face by means of a cement gun. Several plaster slabs ⅝ in. to 1½ in. thick, made at Gem Lake, were tested with water-pressures from 700 to 1600 ft. head for several hours with no moisture coming through the slab. One 1 in. slab held 1610 ft. head for 2½ hours without showing moisture, then the water pressure was raised gradually to 3400 ft. head, when the specimen broke in bending, having leaked a little just before breaking.

At the southerly abutment the last two arches are provided with spillway openings. These spillway openings can be closed with loose flashboards. This it is proposed to do towards the end of the wet season so as to fill the reservoir to within, say one foot from the crest of the dam, thereby gaining two feet of water over an area of nearly 300 acres.

Cost—

The Gem Lake dam contains 8537 cubic yards of concrete and 82 tons of reinforcing steel. The contract price was $22.00 per cubic yard including cement, forms, plastering the upstream face, all tools and materials excepting the reinforcing steel, which was paid for extra at the rate of $110,000 per ton in place. The excavation, of which there was only a limited amount, was also paid for extra. The high cost is explained by the fact that freight rates were high, and further that the distance from the railroad to the power house site at Silver Lake, at the foot of the steep mountains, was nearly 60 miles over desert roads with heavy grades. From the power house site, a tramway approximately 4,500 feet long took all supplies up the mountain side to a lake (Agnew Lake) situated 1250 feet above. At the outlet of this lake the Agnew dam, a smaller structure 30 feet high and 280 feet long, similar in design to the Gem Lake dam, with the exception of having only one strut, was built at the same time and at the same unit prices, in order to increase the capacity of the natural lake. Across this lake all material for use in the Gem Lake dam construction was brought on a barge for a distance of about 2,000 feet to the foot of another tramway terminating at Gem Lake dam site, 550 feet higher in elevation. The cost of these tramways was not included in the $22.00 per cubic yard of concrete, but was paid for extra. They were also necessary for the construction of the pressure pipes, one from Gem Lake and one from Agnew Lake to the power house, and would have had to be built independent of the dams.

For the long haul across the desert from the Southern Pacific railroad station at Benton, California, to the power house at Silver Lake, six 75 h.p. C. L. Best tracklayers, burning distillate, were used, each hauling three trailers. The net load was as close to 20 tons as practical, and the time necessary to make one round trip was about six days of twelve hours, including loading, unloading, and ordinary delays. The speed of these tracklayers was 2½ miles an hour on high gear, and 1½ miles per hour on low gear. The contractors figured the cost to them for hauling this distance was at the rate of $513.50 per ton. The hauling of the cement and materials for the dams was not paid for extra, but was included in the $22.00 per cubic yard of concrete in place.

A rock fill dam on the same site would have to be built for $2.15 per cubic yard (construction cost), including the watertight face and hand laid rock, in order to be on equal terms as to cost, with the multiple arch dam built. In the writer's opinion this would not have been possible in this place. In any locality where cement can be laid down cheaper than in the above case, the relative cost of a multiple arch dam and a rock fill dam will be still more in favor of the multiple arch dam.

Besides furnishing the designs, the writer also supervised the construction of the dams.

Mr. C. O. Poole was Chief Engineer for the whole development, Mr. E. J. Waugh was Resident Engineer, Mr. L. B. Curtis, Field Engineer, and Mr. F. O. Dolson, Superintendent of Construction.

Messrs. Duncanson Harrelson Company of San Francisco were the contractors on the dams.

FOURTEEN RULES FOR ELECTRICAL CONTRACTING PRACTICE

The following Code of Practice is recommended to architects, consulting engineers, contractors and owners as well as owners' engineers, by the National Association of Electrical Contractors and Dealers, the Executive Committee of which adopted and approved it as a step toward the standardization of many practices in connection with the original contracts and those for extras which, unless definitely settled in advance, leads to misunderstanding on both sides and frequently to controversies and litigation. The National Association does not, however, attempt to bind its members to use this code, but respectfully submits same for the approval of both customers and contractors.

Rule VI. The contractor shall not be responsible for loss due to any delay in the execution of the contract when such delay is in no way the fault of said contractor. The time lost by reason of strikes, lockouts, fire, washouts, delays by transportation companies, or any other cause, over which the contractor has no control, will be added to the time of completion of the work covered by the contract.

TRANSPORTATION RATES

BY C. E. GRUNSKY

(The question of transportation rates is perhaps more discussed today than any other one rate problem. Are seven cent fares to be allowed? What of fares and freight tariffs on railroads? Shall long haul reductions be discontinued? These questions are here taken up from the standpoint of their practicability and fundamental justice. The author is well known as a consulting engineer and valuation expert.—The Editor.)

Street Car Fare

The rate schedule of a street car system appears to be of the utmost simplicity. Nevertheless the adjustment of the service to the single fare in a primary zone offers peculiar problems. The points at which a car will be stopped to take on passengers are sometimes close together; the stop may be made to let a single passenger get on or off the car; the passenger may be one of many on the car or he may be the sole passenger; he may be riding a short or a long distance, up hill, or down hill, or along a level stretch of track; he may find the car ready at hand when he desires to get on board or he may have to wait a considerable time before the car arrives at the point where he is waiting for it. When, therefore, he pays the average price for the service immediately desired he may be getting very much more or very much less than an average amount of service. If he lives close to his place of business and yet uses the car in going to and from the same he may be habitually paying many times more for his transportation than others who live far away from the business section.

The relation which exists between the single fare and the average cost of furnishing transportation is lost when the single fare is compared with the cost of rendering the individual service.

If a car line which is under consideration exchanges transfers with another line account must be taken in the cost analysis, of those passengers whose fare must be divided with the other line. The average receipts per passenger carried may be materially less than the single fare for this reason. So, too, the free passes given to employes and municipal officials, as also the special rates to school children and sometimes to workingmen, will reduce the average receipt per passenger. Such circumstances are to be taken into account in any analysis of the net return, in the determination of zone limits or in fixing the amount of the single fare.

The Zone System

The single fare is generally made uniform to simplify collection thereof and is made applicable to zones of greater or less extent, a single primary zone frequently embracing an entire city.

The custom is almost universal in our own country to adopt the smallest convenient coin, the nickel (5 cents) as the minimum and standard fare in the primary zone. This has sometimes resulted in giving the operating company a return which is large in comparison with the cost of rendering the service. Earnings have been in excess of a reasonable return —a condition not always regarded with favor by the public. To correct this situation many cities have adopted a plan of profit sharing or rather a plan under which the community which is being served gets part of the gross earnings. It has been found that when the prospective profits are large the franchise has a market value and can be sold and that the proponents of the street car line are generally willing not alone to pay something for a franchise but also to obligate themselves to make additional future payments based on the gross receipts.

Where the primary zone is relatively small or the number of fares per mile of track is relatively high it has in some cities been found desirable to afford opportunity to get the service at less than the standard 5 cent rate. This is accomplished by using tickets which can be obtained for less than the cost of a single fare. Thus, for example, at Washington, D. C., where 6 tickets can be obtained for 25 cents. When it becomes necessary (as must be expected in time because the value of money is declining) to increase the return of street car lines, the question will be whether to raise the fare or to restrict the primary and other zones throughout which the fare is uniform. Whenever either is attempted there will be protest and the entire question of adequacy of the rate in the light of all the elements that affect the question of net earnings will have to be brought under review.

Essentials in Street Car Operation

In the case of the street car line, perhaps more than in the case of any other public utility, an analysis of all the factors which affect cost of operation and receipts, present and prospective, is essential. It will not do to operate too many cars, nor yet to inconvenience the public by operating too few. Extensions into new territory must be made at the right time. If made too soon the region served may be long in growing up to a paying basis, if delayed too long competition is invited. The general and local growth of the community must be studied in order that the service rendered may keep pace with the demand. The fullest attention to these matters is essential in order that the good will of the public may be retained and so far as practicable competing lines will be kept out of the territory commanded by the system. It goes without saying that in the transportation service, as in the case of other public utilities, as is notably true of the telephone, there should be no competition. The best service can be rendered under unified management provided always that the service is under proper and wise regulation.

The Railroad Rate Schedule

The same fundamental principles should apply in the fixing of a rate schedule for the transportation of passengers and freight over a railroad as apply to other utilities. But owing to the fact that the railroad may come into competition with water transportation there has been a glaring departure from

these principles in one respect which deserves notice. The unequal distribution of overhead has been carried to the extreme. This is particularly noticeable in the resulting low through rates when compared with local rates. It is noticeable, too, whenever the railroad freight rates along a navigable river or canal are compared with the rates for similar service into regions where there is no competition. This is the natural outcome of the desire of the railroad companies to charge "all the traffic will bear." Under regulation there is now a tendency away from this policy and the time is approaching when we may hope to see a fair uniformity in the charge for service wherever rendered. Unification of the railroad systems of the country and their operation under one management, so that the lack of business on one line will be offset by more than average business on another, would be the ideal arrangement. Adjustment to such a program would probably not be as difficult as it might at first appear to be, although there would necessarily be a transition period that would bear heavily here and there.

The Long Haul Question

It is a well known fact that the through freight rates from the Atlantic to the Pacific Coast were fixed with a view to securing business. Certain terminal points were named to which goods could be shipped at rates less than to intermediate points. This resulted in the hauling of goods to points far beyond their ultimate destination and then part way back, and to a charge which could command this amount of service whether the full service was actually rendered or not. During the period when the railroads fixed their tariffs at will they acted upon the theory that the low through freight rates would keep down water competition and that this would result to their advantage. Whether or not the result met their expectations is not so much a question of interest as the broader question of whether they could not in the end have conducted an equally profitable business under rates adjusted approximately at least to the cost of the service.

By the system of low terminal rates the development of the interior of the country has been handicapped. There are those to whom it appears that this was not at all essential to make the railroads successful and that it resulted in disadvantage to the nation. How much better it would have been, for example, to have let the bulk of the cross-continent freight be brought into the Pacific Coast ports by boat and then be distributed to interior points by rail at local rates than to have the freight delivered directly at practically the same cost of transportation to its ultimate destination? There would have been more rapid and larger development of the resources of the country and the steamship and shipping companies could have prospered. The country would not in the present critical period of its history have found itself without a merchant marine.

Artificial Competition with Water Transportation

To justify a continuance of the unbalanced rates even under regulation by the Interstate Commerce Commission, the fiction is still maintained of treating the distance to terminals which are affected by water competition as less than they are in fact. This is, however, an unwise policy and will, it is hoped, be abandoned at an early day. It puts a burden on the other rate payer that he should not be asked to carry. Let the service, where possible, be rendered by the steamboat, even though, for a time, a competing railroad already constructed does not pay. Under one ownership of all the railroads this would result in no hardship provided that the rate schedule throughout was properly rearranged. Needless to say that in many cases the competing road should not have been built at all. That its construction was permitted is in some measure the fault of the public which encouraged the haphazard way in which railroad building was undertaken.

It is not proposed to enter into a full discussion of certain other factors which complicate the problem of adjusting railroad rates to the cost of rendering the service. The reasonableness of the charge must be considered, the question of whether or not rates should be uniform within certain zones; the vast increase of cost that results when the patronage is relatively light as in sparsely settled regions, and the increase of cost when goods are carried in less than carload lots—all these must be weighed when the railroad freight and passenger schedules are to be prepared.

Difficulties in Rate Adjustment

Transportation involves responsibility for the proper care and protection of the persons and articles which are to be transported. Consequently the railroads, and also express companies, take cognizance in their rate schedules not alone of weight but also of bulk, character and value of the articles which are entrusted to them for delivery at a specified destination. Furthermore, as the amount of care and, too, the convenience of handling may be reduced materially by proper boxing and crating, the rates are often much lower for the properly packed article than for the same article unprotected by box or crate. And finally due consideration must be given to an adjustment of rates or rather to the fixing of special, less than average, rates to meet the requirements of certain sections of the country, whose industries or occupations would not otherwise survive. Such circumstances and others often of purely local flavor are constantly presented and make the solution of the railroad rate schedule problem difficult.

The Government Problem

It remains to be stated that under government ownership of the entire railroad system of the country the modification of rate schedules would be a comparatively simple matter. The loss, if any, wherever it results under application of reasonable rates would fall upon the public and would not necessarily be put on those who, at some subsequent time, travel on the railroad or ship freight.

ANOTHER CHRISTMAS IDEA

One of the most welcome Christmas presents for the friend you would like to do something nice for would be a subscription to the Journal of Electricity. If you act now you can get your name in in time to receive a copy of the December 15th issue.

SAVING THE WASTE IN THE CHIMNEY---II

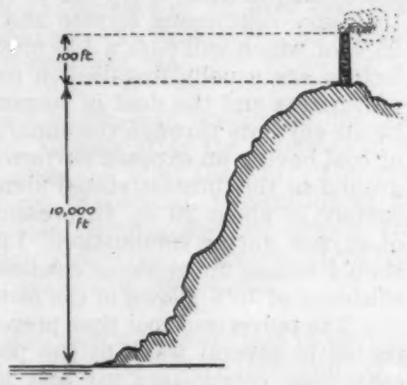
BY ROBERT SIBLEY AND CHAS H. DELANY

(How to compute mathematically the draft that will prevail in a chimney of given height, at a given altitude above sea level, when entering and exit temperatures of chimney gases are known, is a problem that is solved by illustrations in this article. Succeeding articles by these authors will bring out many practical pointers based upon this elementary treatment of chimney draft, where oil is used as a fuel, that should prove helpful in saving the waste in the chimney.—The Editor.)

DRAFT FORMULA FOR THE MODERN POWER PLANT

Assuming that the density of the chimney gas is the same as air under the same conditions of pressure and temperature, we can at once by following the simple numerical illustration given in the last discussion develop a formula not only for a chimney 100 ft. in height, but for any height H and absolute temperature T of entering air and absolute temperature T_1 for temperature of stack gases.

By substituting in the elementary formula for chimney gases connecting pressures, volumes, and



THE THEORETICAL CHIMNEY DRAFT
A stack 100 feet high situated 10,000 feet above sea level, with entering air at 62° F. and exit gases at 500° F., with ash pit door closed and no perceptible leakage through the boiler setting, should register 0.46 inches of draft.

absolute temperature as set forth in the last discussion we have, where W_1 is the total weight of air within the chimney and W the weight of an equal volume of air without the chimney that

$$W_1 = \frac{pV}{RT_1} \text{ and } W = \frac{pV}{RT}$$

Hence the net force pressing inward from the outside heavier air over the entire chimney area A sq. ft. is

Net force in lb. =

$$W - W_1 = \frac{pV}{RT} - \frac{pV}{RT_1} = \frac{pV}{R}\left(\frac{1}{T} - \frac{1}{T_1}\right)$$

If the height of the chimney is H ft. and its area of cross-section A sq. ft. we have, since V = AH,

$$\text{Net force in lb.} = \frac{pAH}{R}\left(\frac{1}{T} - \frac{1}{T_1}\right)$$

Then the net force F over one sq. in. of chimney cross-section would be $\frac{1}{144A}$ of the above, which is

$$F = \frac{1}{144A} \times \frac{pAH}{R}\left(\frac{1}{T} - \frac{1}{T_1}\right) = \frac{pH}{144R}\left(\frac{1}{T} - \frac{1}{T_1}\right)$$

Since p is the atmospheric pressure in lb. per sq. ft., we have that p = 144P, wherein P is the atmospheric pressure in lb. per sq. in., and also, since R = 53.3 we have

$$F = \frac{144HP}{144 \times 53.3}\left(\frac{1}{T} - \frac{1}{T_1}\right) = \frac{HP}{53.3}\left(\frac{1}{T} - \frac{1}{T_1}\right)$$

Converting F from pounds pressure per sq. in. to inches of water by substituting the weight of water at the boiler room temperature which is 62.0 per cubic foot, we proceed exactly as in the numerical example of the last discussion and find that

$$D = 0.52\ HP\left(\frac{1}{T} - \frac{1}{T_1}\right) \quad \text{.....(1)}$$

By means of this formula, we are enabled to compute drafts for any temperatures and pressures. Thus a chimney situated 10,000 ft. above sea-level, where the atmospheric pressure is 10 lb. per sq. in. with a stack of 100 ft., and entrance and exit temperature of 62° F. and 500° F. respectively, would have a draft of

$$D = 0.52 \times 100 \times 10\left(\frac{1}{62 + 459.6} - \frac{1}{500 + 459.6}\right)$$
$$= 0.46 \text{ in. of water.}$$

It is seen that altitude has much to do with chimney drafts, for this identical chimney was previously shown to have a draft of 0.67 inches of water at sea level.

PULVERIZED COAL AND ITS PREPARATION

BY J. M. WADSWORTH

(The first of a series of articles especially compiled for Western needs by the technical staff of the Fuel Administration. The author is state administrative engineer for the California Fuel Administration.—The Editor.)

The great demand for petroleum and its products for war purposes and the increasing recognition of the value of California oils for lubricating products has awakened a wide interest on this coast in the possible use of our semi-bituminous and lignite coals in pulverized form. Without question a constantly decreasing percentage of California oils will be available for fuel in the future as its greater value for other purposes is utilized.

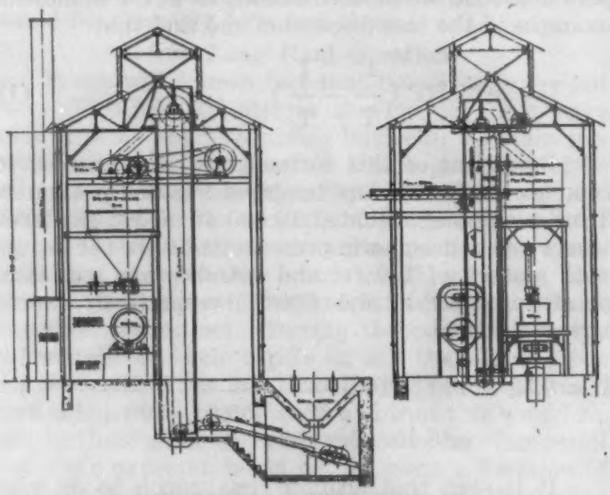
The industries soon must look to other sources for fuel and power. Rapid development of the hydroelectric possibilities of the coast for power and the coal mines for fuel will be the result.

The cost of installation and equipment for burning pulverized coal is about equal to that for a mod-

ern stoker grate system—and from 10 to 20% more efficient as the boiler tests shown below illustrate.

	Powdered Coal.	Hand Fired.
Date of test	Oct. 5	Sept. 16, 1918
Duration of test	4 hours	8 hours
Kind of coal fired	Coal Creek Buck-wheat Powdered	Coal Creek 1/3 Buck-wheat 2/3 Pea
Pounds of coal fired	3240	9950
Pounds of dry coal	3078	8457.5
Pounds of water evorated, actual	23893	44637
Pounds of water evaporated, from and at 212°F.	25644	47909
Pounds of water evaporated, per lb. of coal as fired	7.4	4.49
Pounds of water evaporated from and at 212° F. per lb. of coal as fired	7.9	4.82
Pounds of water evaporated from and at 212°F. per lb. of dry coal	8.3	5.66
Factor of evaporation	1.0733	1.0733
Average steam pressure lbs. gauge	99.5	99.5
Feed water temperature	180°F	180°F.
Stack temperature	525°F	1015°F.
Maximum boiler h.p. development	192.7	214.9
Minimum " " "	164.8	94.5
Average " " "	186	173.5
Efficiency	70%	45%

Conversion from oil fuel to pulverized coal entails a large initial expense for pulverizing and drying equipment but very little change in the furnace.



ARRANGEMENT OF MACHINERY IN A SMALL COAL PULVERIZING PLANT

Coal is dumped into the hopper from the cars, conveyed by belt and elevator to crushing rolls and dropped to the drier bin, thence through the drier to chain elevator discharging into storage bin for pulverizer. From this bin it is fed to the pulverizing mill and delivered by dust collector to the point of use.

Central plants where the coal would be dried, pulverized and distributed to the smaller consumers would therefore make this conversion feasible and cheap. Briefly the coal leaving the mine as slack, lump or run of mine must be treated in the following manner before it is ready for burning.

Upon reaching the pulverizing plant the coal is crushed to approximately 1 inch size in a roll crusher and passes to the drier. The drier is usually of the rotary type, being an inclined cylindrical shell mounted on rollers and rotated during operation. A combustion chamber is usually provided below the shell and the hot gases given one pass outside the drier and a second through it. The crushed coal is fed into the high end and by means of baffles is held to the sides during its slow travel by gravity to the low end. The moisture content is reduced to 1% except with lignites which can be successfully pulverized and handled with as high as 5 % content. Temperature control is obtained by means of a pyrometer to prevent any volatile content being distilled off during drying.

In all modern plants a magnetic separator is provided either before the crusher or after the drier for removing scrap iron such as pick points, spikes, hammer heads, sledges, etc., which would otherwise pass through the pulverizing mills and cause undue wear and frequent shutdowns.

After drying the coal is elevated to bins of sufficient capacity to keep the pulverizers amply supplied. These bins are dust tight and equipped with deep hoppers so that the coal is in constant motion. It is considered best practice to avoid permitting the coal to lie stationary, particularly when under pressure, as these are conditions contributory to spontaneous combustion in the presence of sufficient oxygen. The hazard from spontaneous combustion of pulverized coal is greatly exaggerated and with ordinary precautions to prevent great absorption of oxygen—no greater risks are entailed than with other fuels.

The coal is fed continuously to the pulverizers which may be of any approved type and are usually electrically driven. They are of rugged construction to insure continuous service and deliver a product 95% of which will pass a 100 mesh sieve. Dust collectors are usually installed in connection with the pulverizers and the dust in suspension carried away by air currents through the apparatus. A cubic inch of coal having an exposed surface of 6 sq. in.—when ground to the fineness stated above, has an exposed surface of about 20 sq. ft. presented for absorption of oxygen during combustion. Little unburned fuel should escape under these conditions and the boiler efficiency of 70% shown in the tests bears this out.

The pulverized coal thus prepared may be transported in several ways to the point of use—screw conveyors, compressed air and air suspension are three methods most commonly used.

Costs are difficult to state for handling the coal but Mr. H. G. Barnhurst, chief engineer for the Fuller Engineering Company, states the power required in a modern pulverized coal plant per net ton of coal handled is about 17 h.p. hours. This includes power for crushing, drying, elevating, conveying and delivering the pulverized coal to the point of use.

Further, assuming prices as stated below, the cost of pulverizing and drying in a 50 ton plant—neglecting interest and depreciation—would be approximately 50c a ton.

Coal.....$5.00 per ton
Labor ..... .40 an hour
Coal of 10% moisture content.

Finally, pulverized coal has undoubtedly passed the experimental stage — there are in fact about 11,000,000 tons of it, of all kinds from lignite to anthracite, burned annually in the United States. The largest and most likely field for application of pulverized coal mainly owes its development in the East. Five million bbls. of cement are burned annually in California with a consumption of about 60,000,000 gallons of fuel oil. Conversion of this industry alone to pulverized coal would release this oil and supply a market for approximately 350,000 tons of the local coals, the ash content of which, assumed as 10%, would be fused in with the clinker as a necessary part of the finished cement and a direct gain for the manufacturer.

SPARKS—Current Facts, Figures and Fancy

(The call for food is not lessened with the end of the war and the example of the Juneau Indians may well serve as an inspiration to those of us with more luxuries. A hint of how English business men—even of the smaller concerns—had looked ahead to reconstruction problems is seen in the item from London. The municipal laundries of Uruguay are not electrical—but why not?—The Editor.)

A reel that can be attached to an automobile has been introduced to facilitate the rolling up or paying out of wire. For take-up use, the reel is attached to the rear wheel of an automobile that has been jacked up. This operation requires no tools, and can be performed quickly.

* * *

Japan, too, is growing electrically. The Department of Communications in May of this year reported 691 enterprises for central stations and electric railways, an increase of 42 over last year. The capital invested was 735,356,769 yen, an increase of 69,970,107 yen over last year.

* * *

An association of one-man businesses has been formed in London, to look after the interests of its members both during and after the war. The association has received the official recognition of the Ministry of National Service, and has grown until it numbers among its members representatives from practically every trade and profession.

* * *

Even electric motors were mobilized in Germany and were threatened with a severe legal penalty for non-compliance. An embargo had been placed on all motors of 2 h.p. and upwards which are not regularly in use in establishments engaged on war work, exceptions being made in the cases of lift motors in ordinary use and motors used for auxiliary war work. Owners are under command to report the possession of such motors to the military authorities.

* * *

Like so many things, the process of enameling porcelain was discovered by accident. About the year 206 B. C. some Chinese workers of earthenware set their pots in an oven to bake and forgot them. When they remembered to open the oven they found the pots vitrified in shining spots. Development of monochromatic glazing and color experimenting was interrupted by the Mongol invasion, but the dynasty of Ming restored the imperial manufactories and the ancient methods were revived and perfected.

* * *

The United Gas Improvement Company of Philadelphia has evolved an unusual variation of the suggestion box idea to use in connection with its "safety first" campaign. The company has equipped the ordinary light sheet metal box with a flash lamp, double-glass slides, and a short section of insulation cable. The flashing light throws the lantern slides into bold relief and attracts attention to its lessons of carefulness or display of "horrible examples." The box has room on the sides for the display of letter-size bulletins, and a slot in the top through which the written suggestions may be dropped.

* * *

The native Indians in the Juneau region are so greatly impressed with Hoover's propagandism that they have reduced their dog herds to one-third or one-quarter the normal size, in order to save food for the allies and to prevent the destruction of deer and other animals important to the food supply at home. The Alaskan contribution to the world's food resources in the form of canned fishes is enormous. And their patriotism compares favorably with their material contribution.

* * *

According to a law of June 27, 1918, the Uruguayan Government is to construct, within the next four years, municipal laundries or washing places (lavaderos) in all the cities of the republic. The maximum yearly expenditure for these buildings is to be 22,000 pesos ($25,750), but if the municipalities have the necessary funds they may construct their own washing places, according to government requirements, and so release the government money for expenditure elsewhere. Salto, Paysandu, Mercedes and San Jose will receive the first series of four buildings.

* * *

The public have often wondered what caused the singing of telegraph wires, and what produced the variation in the pitch of the sound. There is a popular belief that the singing is a weather prognostic, although opinions differ as to the kind of weather it foretells. The wind, of course, and not electricity as some believe, causes the phenomenon and its occurrence depends chiefly upon the direction of the wind in relation to the direction in which the wires run. Changes in the tension of the wires with variation of temperature account for the varying pitch of the sound.

* * *

At the Coast Shipping Company yard, Portland, Oregon, they have hit upon an appropriate new scheme of ceremonies to attend a launching. Instead of bedecking the vessel with ribbons and smashing the usual bottle of champagne against her prow, the sponsor merely cuts a single ribbon to which a slotted milk bottle full of money is attached. As the ship speeds out to her work on the sea, she leaves behind her the bottle of "champagne money" as an omen of good cheer to the dependent children of France and Belgium. And the launchings are just as much fun as ever.

PERSONALS

H. A. Lemmon, salesmanager of the Truckee River General Electric Company of Reno, Nevada, leaves shortly for Europe where he will be engaged for the next two years assisting Herbert Hoover in his problem of feeding the world, including the peoples of those countries who opposed the allied nations in the recent international struggle. Mr. Lemmon comes to this splendid new honor due to his effective work in Nevada during recent months as Food Administrator for that commonwealth and as manager of many of the national drives for funds that have taken place from month to month during the war period. Mr. Lemmon is well known to members of the electrical industry throughout the West. As a contributor to the columns of the Journal of Electricity on the psychology of salesmanship his series of articles have received unusually wide and favorable comment by a large group of readers throughout this section.

Harry Gerran, electrical supply man of Buffalo, N. Y., is a recent San Francisco visitor.

R. R. Wight, telephone engineer with the Bell interests, has been visiting in San Francisco.

J. F. Kinder, electrical supply man of Portland, has been in San Francisco within the last two weeks.

J. A. Kelly has completed the electrification of the Bellingham Coal Mine near Bellingham, Washington, owned by John C. Eden of Seattle.

F. J. Airey, Los Angeles manager of the Pacific States Electric Company and **G. L. Oman,** Portland manager of the Company are recent San Francisco visitors.

E. Herbert, engineer with the Western Electric Company, New York, has been spending some time on the Pacific Coast and has recently been in San Francisco.

Wm. E. Jones, representing the Economy Fuse & Manufacturing Company, 935 Henry building, Seattle, was in Salt Lake City recently looking after business matters.

H. F. Jackson, president of the Sierra & San Francisco Power Company, has left San Francisco on a business trip to New York City covering a period of several weeks.

Paul Quick, representing Landers-Frary & Clark Company, with plant at New Britain, Connecticut, returned to San Francisco recently via Portland, after a month spent in the Northwest.

J. C. Manchester, San Francisco manager of the Economy Fuse Company, has recently spent ten days in Los Angeles where he helped to locate **Geo. W. Davis** as representative of the company in that district.

E. D. Walthall, assistant general manager of the San Joaquin Light & Power Corporation and chairman of the commercial section of the Pacific Coast Section, N. E. L. A., is recovering from a severe attack of influenza.

D. L. Wishon, for fifteen years civil engineer in charge of reconnaissance work for the San Joaquin Light & Power Corporation, has been appointed general agent and manager of the Bakersfield district of the company to succeed E. D. Farrow, Jr., resigned, as announced in the last issue of the Journal of Electricity.

John B. Miller, chairman of the Board, Southern California Edison Company, and **A. G. Wishon,** general manager of the San Joaquin Light & Power Corporation, are recent visitors at San Francisco, where they were guests of honor on the Old Timers' Day of the San Francisco Electrical Development League Nov. 25, 1918.

Percy A. Cupper, formerly assistant engineer of the State of Oregon, has been appointed state engineer to succeed his former chief, John H. Lewis, resigned. Mr. Cupper was recently elected superintendent of Water Division No. 1 of the state of Oregon and a movement is on foot to merge that office with that of the state engineer.

Petseyo Kosugi, representative of the Kuhara Mining Company of Osaka, is in Portland, Ore. Mr. Kosugi was last on this coast 26 years ago and he is impressed with the wonderful growth of the city. The Kuhara Company is the largest factor in Japan, and controls the steel yards in Kiobe, besides operating steamers to the Orient. There is some possibility of a boat line to Portland, although there are no definite plans at present.

W. H. Hammond, formerly with the San Joaquin Light & Power Corporation, was recently seriously wounded upon the battlefield in France. He was shot in the chest, the bullet coming out at the arm pit. Mr. Hammond is a nephew of John Hays Hammond and son of Wm. H. Hammond, who with A. G. Wishon, general manager of the San Joaquin Light & Power Corporation, originally surveyed the power sites of the Mt. Whitney Power & Light Company.

Fred A. Rasch, utilities engineer for the Public Service Commission, has spent some time in Eugene and Marshfield, Oregon, where he has been making an appraisal of the plants owned by the Oregon Power Company. This utility recently applied to the Commission for permission to increase its rates, but the application will not be passed upon by the Commission until it has completed its appraisal of the property as a basis for determining the merits of the company's request.

John D. Ryan, president of the Montana Power Company, who has been acting as second assistant secretary of war and director of air service, has sent his resignation to Secretary of War Baker, effective as soon as convenient. In his letter of resignation, Ryan said: "Labor and industry of the country must be quickly adjusted from a war to a peace basis and the copper production is one of the most vital to the country's welfare. I believe I can do much in helping to bring about stable conditions and that I should take up the work immediately." Secretary Baker has accepted the resignation, asking Ryan to remain in office until plans for contract cancellations and demobilization of the air forces are completed.

Cyrus A. Whipple has been appointed Power Plant Foreman of the U. S. Navy Yard at Puget Sound, Bremerton, Washington. This position gives him charge of all electrical, hydraulic, air and other power utilized at the Navy Yard and auxiliary stations. Mr. Whipple is a graduate of University of Washington, 1899, and Cornell University, 1903, and has been engaged in engineering work on the Pacific Coast since 1903. He was one of the engineers on the construction of the Electron plant of the Puget Sound Traction, Light & Power Co., after which he worked out the consolidation of the Navy Yard Power System which he is now operating. He was next engaged in building the Fraser Valley Electric Interurban system extending from Vancouver to Chilliwach, British Columbia. On completion of this he was Superintendent of Operation for the Mt. Hood Railway Light & Power Co. of Portland, Oregon, until it was sold out to the Portland Railway Light & Power Co., when he opened his

private office in Portland. When the Southern Pacific started electrification of their Willamette Valley System, Mr. Whipple entered their system as Chief Assistant to the Electrical Engineer, which work he followed until construction was nearly completed. Leaving the above work he was appointed Superintendent of Light and Water for the city of Eugene, Oregon, where he made marked improvements in operating conditions and reduced electric costs and rates. The Washington State Public Service Commission engaged his services as Electrical and Mechanical Engineer in which he was engaged in appraisal of all the large companies of the State.

Yasujiro Sakai, formerly a brilliant student in the electrical engineering department of the University of California with the class of 1903, has recently become professor of electrical engineering at the Imperial University of Kyushu, Japan. After graduation from the University of California Mr. Sakai completed an apprentice course at the shops of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. He then went back to his native country and became consulting electrical engineer for Takata & Company, a large engineering firm in Tokyo, representatives of the Westinghouse Company in Japan. Later he became engineer for the Yasukawa Electric Company, a well-known manufacturing concern for electric supplies in Japan. Before entering upon his recent distinguished duties, he was professor of electrical engineering of Meiji College in Japan. The view shown is taken in front of the Imperial Hotel in Tokyo and from left to right shows: Yasujiro Sakai, the new professor of electrical engineering at the Imperial University, Robert Sibley, editor of the Journal of Electricity, and Y. Yabe, a graduate of the University of California with the class of 1902 and now a prominent newspaper man in Japan.

L. B. Faulkner of Olympia, Washington, has been elected to the presidency of the Olympia Light & Power Company, filling the vacancy caused by the death last month of General Hazard Stevens, who held that position since the reorganization of the company in 1900. Mr. Faulkner has been been manager, treasurer and trustee of the company since its organization and took an active part in the formation of the Northwest Electric Light & Power Association, since the organization of which he has been a member of the executive committee and is now the president of the organization. He has long been recognized as a potent factor in the electrical industry in the West and the hearty congratulations of men of the industry go with him in this broadened scope of activities with his company.

John H. Lewis has resigned as state engineer of the State of Oregon to become chief engineer and general manager of the Warmsprings Irrigation District, involving some 40,000 acres of land in Malheur county, Oregon, requiring the construction of an arched concrete dam, 100 ft. in height. This is generally conceded to be one of the best irrigation projects in Oregon, and Mr. Lewis' identification with it bespeaks its successful completion. Mr. Lewis entered upon the duties of his former office as the result of the passage of the fragment of the water code, which the U. S. Reclamation Service and others attempted to have passed in 1905. After a vain attempt to improve the statute in 1907, he succeeded in having a model water code adopted in 1909. This statute has served as a model for the laws of Washington, California, Nevada and other states. So successful has been his administration that those most strongly opposed to the enactment of the water code now eagerly seek the assistance of the office.

A. R. MacKenzie, a well known British Columbia irrigation engineer, who is now serving as a Major of Engineers in the 3rd Battalion, Canadian Railway Troops in France, most interestingly writes to A. E. Chandler, president of the San Francisco Engineers' Club: "I have about 600 men to handle and am keeping open day and night about 60 miles of track in the forward area—my record for one month was just over 200 breaks with direct hit of shell fire and as the service of rations and ammunition has to be maintained uninterruptedly, you can imagine I have my cares. Have a splendid bunch of officers and men—split up into about eleven or twelve detachments—all operating under both shell and gas—what sportsmen and men they all are.

"However the reward seems now in sight and before you get this the Boche beast may have thrown his hands right up in the air. My area at present—a very important mining district—covers the most awful scene of desolation I have yet seen along the front. I am not exaggerating when I say that the damage to mining machinery and towns destroyed would not be covered by two thousand million dollars—it is simply awful. However, the day of reckoning is near and as long as you live, old man, thank God that as an example to the rest of mankind in the way of bearing suffering, we have these wonderful French people. My dear native country of Scotland has in truth been decimated in bereavement—but at least the homes of centuries have been spared.

"Except for stray officers getting wise to essential features, we have not seen many Americans on our part of the front, but the news of them from British officers and men, of what they are doing where their responsibility lies, does them infinite credit. Every one of them is a credit to his native land and my dear chap, when I think of the Anglo Saxon brotherhood that is to come out of all this tragedy, I'm glad I've been spared so far."

OBITUARY

O. A. Walthall, agent of the Coalinga District of the San Joaquin Light & Power Corporation, passed away during the recent influenza epidemic in the San Joaquin valley. Mr. Walthall was a brother of E. A. Walthall, assistant general manager of the company. He was held in high regard by electrical men throughout the West and his helpful presence will be sorely missed in many quarters.

W. H. Pickering, electrician for Multnomah county, Oregon, died November 12th of Spanish influenza. He was a member of the Board of Electrical Examiners of the city of Portland, Oregon.

Prof. Ichisuke Fujioka, president of the Tokyo (Japan) Electric Company and director of several other firms, died of apoplexy on March 5, 1918. Professor Fujioka was particularly well known in electrical circles in the United States and had been a subscriber of the Journal of Electricity as far back as 1896. He was an honorary member of the National Electric Light Association and an associate member of the American Institute of Electrical Engineers.

Walter G. Held, at the time of his enlistment connected with the Railway Department of the Puget Sound Traction, Light and Power Company, Seattle Division, made the supreme sacrifice for his country when he was killed in action on the battlefield of France, September 21st. Mr. Held was a member of Company F, Twenty-sixth infantry, and went to France with the Rainbow Division. He was wounded in July, and a few days after recovering returned to the front, where he was killed.

E. B. Nance, chief statistician of the Portland Gas & Coke Company and the Pacific Power & Light Company, died at the Good Samaritan Hospital Wednesday forenoon, following an attack of influenza and pneumonia.

MEETING NOTICES FOR ELECTRICAL MEN

(The influenza ban being lifted in most localities, meetings are again resumed. A second Old Timers' Day at the San Francisco Development League repeats the success of that of last year. Report is made of the Jovian changes.—The only convention in prospect is that of the Electrical Supply Jobbers at Del Monte on Dec. 5, 6, 7.—The Editor.)

Oregon Electrical Contractors' Association

The next regular meeting will be held at 6:30 p.m. Nov. 25, 1918, at the Seward Hotel Annex, Portland, Oregon. No meetings have been held lately on account of the "flu."

Joint Meeting at Portland

A joint meeting of the local sections of the A. I. E. E. and N. E. L. A., Portland, Oregon, will be held Tuesday evening, Dec. 3, 1918, at 8:00 p.m. at the Multnomah Hotel in Portland.

Mr. W. L. Morrison, manager and metallurgist for the Western Reduction Company, Portland, Ore., will deliver a paper on "Electric Smelting." The October meeting was postponed on account of the influenza epidemic.

Seattle Section, A. I. E. E.

The Seattle Section of the A. I. E. E. held its regular meeting at the Chamber of Commerce, Assembly Room, on the ninth floor of the Arctic Building. Dr. C. E. Magnusson presented "A basic plan for the development of our national electric power resources"—following the outlines of the plan published in the last issue of the Journal of Electricity.

San Francisco Advertising Club

Julius Kahn was the speaker at a recent meeting of the San Francisco Advertising Club on Wednesday noon, Nov. 20, 1918. His subject was "Harbor Development and Foreign Trade"—and he pointed out some of the opportunities which are open to Western enterprise.

The San Francisco Electrical Development League

Meetings of the League have been changed to Monday noons to suit the greater convenience possible in accommodations.

The first of these Monday meetings was also the first meeting of the year after the removal of the "flu" ban—and took place on Monday, Nov. 25th. "Old Timer's Day" was the feature of the occasion and the League members had as their guests John B. Miller, A. G. Wishon, F. J. Cram, John A. Britton, Dr. Thomas Addison, H. V. Carter, Frank Smith, E. B. Strong and Samuel H. Taylor, who spoke, as the invitation put it, "of days before the Ark-light." The reunion was a pleasant one and well carried out in the spirit of the occasion.

The Jovian League Constitution

The changes of the constitution adopted by the Jovian League at its convention at Dallas in October of this year provide for a reduction of dues in certain cases and an increase in others.

The plan involves three major changes in the constitution:

First: The annual dues of active members are reduced from $4.00 to $2.00, this with a view of making it possible for any eligible person to become a member of the order. At the same time, other classes of membership have dues running from $5.00 to $20.00 per year, leaving it optional with any member as to the class of membership he will take.

Second: The Jovian Order, through its Leagues, can be made of great benefit to those industries of the country engaged in the electrical business, either as utilities, or as manufacturers and jobbers of electrical supplies. Hence it is made possible for electrical utilities, firms and corporations to become underwriting members of the Jovian Leagues, and as such they can be called upon to furnish a portion of the revenue necessary to keep the Jovian Order solvent.

Third: The officers of the Jovian Order as at present constituted serve for one year only. It is now provided to create a body to be known as Jupiter's Cabinet, whose special duty it will be to administer all the business affairs of the order, and to make sure that the Cabinet be composed of men of experience and business ability, it is proposed that each of its six members be not only a Patron Member of the order, but an executive or authorized representative of a firm or corporation, that is, an underwriting member of the order.

BUILDERS OF THE WEST—XLI

CHAS. K. FIELD

The vision of the Great West—its hopes, its aims, its vast material possibilities—has been carried to every quarter of the globe through many channels of expression. In this labor of love, the Sunset Magazine, devoted to the helpful and constructive upbuilding of this vast section of our country, has performed a lasting and enduring work. To Charles K. Field, editor of the Sunset Magazine and representative of that splendid group of workers who have labored in its behalf for so many years, this issue of the Journal of Electricity is dedicated as a lasting memorial for the part Sunset Magazine has played as a "Builder of the West."

Denver A. I. E. E.

The November meeting of the Denver Section of the A. I. E. E. was held on Saturday, Nov. 23rd, at the Denver Athletic Club. Prof. H. S. Evans, Acting Dean of Engineering of the University of Colorado, spoke on the "Training of University Students for War Service." The regular dinner was held at 6:30 and followed at 7:30 by the meeting program.

The Society for Electrical Development, Inc.

At the meeting of the Board of Directors of The Society for Electrical Development, held on Tuesday, Nov. 12th, the possible future activities of the society were given careful consideration; the fact that the war had virtually ended the day before changed the entire aspect and the new conditions had to be considered. In the General Manager's report, it was suggested that the society's activities to educate the public to an appreciation of the advantages of electric service should be continued, and that the society could do a valuable work along the lines of helping the reconstruction of the electrical industry upon a peace basis. This would include a number of very important items, and carefully prepared propaganda. To do the work thoroughly well would cost money, and the society would have to have the fullest support of the electrical industry.

It was voted to bring the matter to the attention of the manufacturers in session at Hot Springs, Virginia, and a committee was appointed to meet with the jobbers at their Cleveland Convention in December; another committee was appointed to take up the matter with the contractor-dealers at the next meeting of their Executive Committee, these Society committees to request the manufacturers, jobbers and

contractor-dealers to appoint committees to meet with a special committee from the society, consisting of Messrs.:

Henry L. Doherty, representing central stations,
Gerard Swope, representing jobbers,
L. P. Sawyer, representing manufacturers,
James R. Strong, representing contractor-dealers,
J. Robert Crouse, representive-at-large,

to discuss with this committee the future activities of the society and the increase of its membership.

President Doherty expressed the opinion that instead of the society formulating a program at this time and trying to sell the program to the industry, it would be better to have the various associations express their views regarding a future program which the society could follow, and ask for their support on the ground of their own suggested programs.

In the meantime, the society will continue its present activities.

WHERE THE MEN OF THE INDUSTRY MEET

(The place where you can find where and when the other man meets. Information as to changes in officers, or additions or corrections, should be addressed to the Service Editor, Journal of Electricity. It is hoped to keep this directory up to date, so that travelers in a strange town who wish to attend the meetings of allied groups may not be misdirected.—The Editor.)

A. I. E. E.—WESTERN SECTIONS

National Officers
President—Comfort A. Adams, Harvard University.
Secretary—F. L. Hutchinson, Engineering Society Bldg., New York City.
Meetings—Monthly.

Los Angeles Section
Chairman—J. H. Cunningham, Southern California Edison Co., Los Angeles.
Secretary—Clem A. Copeland, Bureau of Power and Light, Los Angeles.
Meetings—Second Tuesday of each month.

Portland Section
Chairman—R. M. Boykin, care North Coast Power Co., 441 Pittock Block, Portland, Ore.
Secretary—W. D. Scott, Pacific Telephone & Telegraph Co., Portland, Ore.
Meetings—Monthly.

Denver Section
Chairman—Fred J. Rankin, Colorado Pub. Utilities Com., Denver.
Secretary—Robt. B. Bonney, 603 Wyoming Bldg., Denver, Colo.
Meetings—Third Saturday of each month, from October to May, at the Denver Athletic Club. Dinner at 6:15 p.m., followed by regular meeting.

San Francisco Section
Chairman—J. C. Clark, Stanford University, Cal.
Secretary—Allen G. Jones, Rialto Bldg., San Francisco.
Meetings—Fourth Friday each month—Engineers' Club, 7 p.m.

Seattle Section
Chairman—John Harisberger, 4015—4th Ave. N. E., Seattle, Wash.
Secretary—Glen Dunbar, City Lighting Department, Seattle, Wash.
Meetings—Monthly on third Tuesday in Chamber of Commerce Assembly Room, 9th floor, Arctic Bldg.

Spokane Section
Chairman—George Nixon, Main and Lincoln Sts., Spokane.
Secretary—G. H. Hoppin, 1128 W. Kiernan Ave., Spokane.
Meetings—Third Friday of each month.

Utah Section
Chairman—A. S. Peters, Mountain States Telephone & Telegraph Co., Salt Lake City, Utah.
Secretary—H. T. Plumb, 183 U St., Salt Lake City, Utah.
Meetings—Third Wednesday of alternate months, 8 o'clock. Assembly Room of Commercial Club, Salt Lake City.

Vancouver Section
Chairman—R. F. Hayward, Western Canada Power Co., Ltd., Vancouver, B. C.
Secretary—T. H. Crosby, Canadian Westinghouse Co., Vancouver, B. C.

A. I. E. E.—WESTERN BRANCHES

University of California Branch
Chairman—A. J. Swank, University of California, Berkeley, Cal.
Secretary—G. F. Teale, University of California, Berkeley, Cal.

University of Colorado Branch
Chairman—Albert S. Anderson, Boulder.
Secretary—Terril C. Smith, University of Colorado, Boulder.
Meetings—First and third Thursdays of each month of the school year in the Engineering Building, University Campus.

Idaho University Branch
Chairman—V. Pearson, Moscow, Idaho.
Secretary—L. J. Corbett, University of Idaho, Moscow, Idaho.
Meetings—First Wednesday evening of each month from October to June.

Oregon Agricultural College Branch
Chairman—J. A. Hooper, Oregon Agr. College, Corvallis, Ore.
Secretary—L. Happold, Oregon Agr. College, Corvallis, Ore.

Stanford University Branch
Chairman—C. H. Suydam, Stanford University.
Secretary—Frank Miller, Stanford University.

Montana State College Branch
Chairman—Roy C. Hagen, Montana State College, Bozeman, Mont.
Secretary—J. A. Thaler, Montana State College, Bozeman, Mont.
Meetings—Third Friday of every month of the school year in the Electrical Bldg.

Colorado State Agricultural College
Chairman—R. C. Richards.
Secretary—W. A. Stallings, Colorado State Agricultural College, Fort Collins, Colo.

Throop College of Technology Branch
Chairman—J. Paul Youtz, Throop Dormitory, Pasadena, Cal.
Secretary—Clark E. Baker, Throop Dormitory, Pasadena, Cal.

State College of Washington Branch
Chairman—Clarence E. Guse, Pullman.
Secretary—Ralph C. Guse, State College of Washington, Pullman.
Meetings—Bimonthly at Mechanics Art Bldg., Pullman, Wash.

CONTRACTOR-DEALER ASSOCIATIONS

National Association of Electrical Contractors and Dealers
Chairman—W. Creighton Peet.
Secretary—Harry C. Brown, 110 West 4th St., New York.
Executive Committeemen-at-Large—W. D. Kohlway, California; Executive Committeeman—S. C. Jaggar, Portland.

British Columbia Ass'n Electrical Contractors and Dealers
President—E. Brettell, Vaucouver, B. C.
Secretary—Capt. W. J. Conway, Vancouver, B. C.
Meetings—First Tuesday of each month.

California Ass'n of Electrical Contractors and Dealers
President—H. C. Reid, 507 Montgomery St., San Francisco.
Secretary—J. W. Redpath, Rialto Bldg., San Francisco.
Meetings—Monthly.

Electrical Contractors and Dealers Ass'n of San Francisco
President—J. M. Carlson, 175 Jessie St., San Francisco.
Secretary—J. W. Asher, 601 Howard St., San Francisco.
Meetings—Monday, 12:15; Jules Sutter Cafe.

Southern California Electrical Contractors and Dealers
President—G. E. Arbogast, 724 So. Olive St., Los Angeles, Cal.
Secretary—J. E. Wilson, 425 Consolidated Realty Bldg., Los Angeles, Cal.
Meetings—Every Friday at 6:30 p.m. at the Pin Ton Cafe, 427 South Broadway.

Monterey Bay Electrical Contractors and Dealers
President—W. Cox, Santa Cruz.
Secretary—J. A. Noggle, Monterey.

Nevada Ass'n of Electrical Contractors and Dealers
President—F. V. McAvoy, 138 N. Canter St., Reno.
Secretary—R. W. Shearer, 215 Sierra St., Reno.
Meetings—Twice a month, 15th and 30th.

Oregon Ass'n of Electrical Contractors and Dealers
President—R. C. Kenney, Portland.
Secretary—J. Willis Oberender, 301-2 Dekum Bldg., Portland, Ore.

Portland Local Ass'n of Electrical Contractors and Dealers
President—J. H. Sroufe, Jaggar-Sroufe Co., Portland.

Sacramento Section, California Electrical Contractors & Dealers' Association
President—W. H. Gribble, Sacramento.
Secretary—H. Berg, Sacramento.

Utah Society of Electrical Contractors and Dealers
President—J. V. Buckle, Buckle Electrical Co., 70 E. 1st St., Salt Lake City.
Secretary—E. H. Eardley, Eardley Bros. Co., 37 E. 1st St., Salt Lake City.
Meetings—Every Friday noon at Commercial Club.

Washington Ass'n of Electrical Contractors and Dealers
President—V. S. McKenny, NePage & McKenny Co., Armour Bldg., Seattle, Wash.
Secretary—Forrest E. Smith, Seattle, Wash.
Meetings—Quarterly—second Thursdays of March, June, September and December.

JOBBERS' ASSOCIATIONS

Electrical Supply Jobbers Association
General Secretary—Franklin Overbagh, 411 So. Clinton St., Chicago, Ill.
Meetings—Semi-annual.

Pacific Coast Electrical Supply Jobbers
President—W. S. Berry, Western Electric Company, San Francisco.
Secretary—Albert H. Elliot, 544 Market St., San Francisco.
Meetings—Quarterly.

Electrical Credit Ass'n of the Pacific Coast
President—C. L. Gilson, Gilson Electrical Supply Co., 304—12th St., Oakland, Cal.
Secretary—Albert H. Elliot, 544 Market St., San Francisco.
Meetings—annually; San Francisco; May.

OF ELECTRICAL INTEREST

California Electrical Cooperative Campaign
Chairman Advisory Committee—L. H. Newbert, 445 Sutter St., San Francisco.
Secretary—J. W. Redpath, Rialto Bldg., San Francisco.

National Electric Light Association
President—W. F. Wells, Edison Elec. Illuminating Co., Brooklyn.
Executive Secretary—T. C. Martin, 33 W. 39th St., New York City.

Nevada Section, N. E. L. A.
Chairman—Geo. A. Campbell, Reno, Nev.

Pacific Coast Section, N. E. L. A.
President—Samuel Kahn, Western States Gas & Electric Co., Stockton, Cal.
Secretary—A. H. Halloran, Journal of Electricity, Crossley Bldg., San Francisco.
Meetings—Annually, in April.

Portland Section, N. E. L. A.
Chairman—H. H. Schoolfield, Pacific Power & Light Co., Portland.
Secretary—F. H. Murphy.

Illuminating Engineering Society
President—George A. Hoadley.
Secretary—Clarence L. Law.
Western Representatives—Romaine Myers, Bacon Bldg., Oakland, Cal.; C. M. Masson, Edison Bldg., Los Angeles; F. H. Murphy, Portland Railway Light & Power Company, Portland, Ore.; W. R. Putnam, Utah Power & Light Company, Salt Lake City; Fred A. Osborn, University of Washington, Seattle, Wash.
Meetings—First Tuesday each month.

New Mexico Electrical Association
President—M. R. Buchanan, Silver City, N. M.
Secretary—E. M. Haggerson, Silver City, N. M.
Meetings—Annually, in February.

Southwestern Electric and Gas Association
President—W. A. Sullivan, Shreveport, La.
Secretary—H. S. Cooper, 403 Slaughter Bldg., Dallas, Texas.

Northwest Electric Light and Power Ass'n
President—L. B. Faulkner, Olympia Light & Power Co., Olympia, Wash.
Secretary—Geo. L. Myers, 1212 Spalding Bldg., Portland, Ore.
Meetings—Convention held annually. Executive Committee, governing body of Association, meets upon call of its chairman.
New officers announced later.

Los Angeles Jovian Electrical League
President—H. N. Sessions, San Fernando Bldg., Los Angeles.
Secretary—W. C. McWhinney, Southern California Edison Co.
Meetings—Every Wednesday, 12 m.

San Francisco Electrical Development League
President—Garnett Young, 612 Howard St., San Francisco.
Secretary—J. W. Redpath, Rialto Bldg., San Francisco.
Meetings—Every Monday, 12:10 p.m.; luncheon, Palace Hotel.

Electric Metermen's Association
President—J. E. Bridges, Westinghouse Electric & Manufacturing Company.
Secretary—A. E. Coney, Great Western Power Company, San Francisco.
Meetings—About every 60 days.

Alameda County Electrical Club
President—George Drew, Pacific States Electric Company, Oakland, Cal.
Secretary—George B. Furniss, Pacific Gas & Electric Company, Oakland, Cal.

Synchronous Club
Secretary—H. N. Beecher, City Hall, L. A.

Telephone and Telegraph Society of the Pacific Coast—San Francisco Section
President—W. H. Brammage, Pacific Tel. & Tel. Co., San Francisco.
Secretary—Chas. H. Dodson, 835 Howard St., San Francisco.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS

National Officers
President—Charles T. Main, Engineering Society Bldg., New York City.
Secretary—Calvin W. Rice, Engineering Society Bldg., New York City.

San Francisco Section, A. S. M. E.
President—E. C. Jones, Pacific Gas & Electric Co., San Francisco.
Secretary—Geo. L. Hurst, Bethlehem Ship Bldg. Corp., Ltd., San Francisco.
Meetings—Quarterly.
Thursday lunches have been arranged at the Engineers' Club, 57 Post St.

Los Angeles Section, A. S. M. E.
President—Charles H. McGuire.
Secretary—T. J. Royer.
Meetings—Quarterly.

ENGINEERS' CLUBS

Oregon Society of Engineers
President—Orrin E. Stanley, Box 973, Portland, Ore.
Secretary—C. J. Hogue, Box 973, Portland, Ore.
Meetings — Annual: Feb. 4, 1918. Monthly: Third Thursday of each month.

The Engineers' Club of Seattle
President—J. F. Pinson, Seattle, Wash.
Secretary—E. J. Bartells, Northern Life Bldg., Seattle, Wash.
Meetings—Thursday noon at the club rooms at 410 Arctic Bldg. A buffet luncheon is served every day. A special welcome is extended to all engineers visiting the city.

Engineers' Club of San Francisco
President—A. E. Chandler, New Call Bldg., San Francisco.
Secretary—J. R. Brownell, 525 Market St., San Francisco.
Annual Meeting: October.

Idaho Society of Engineers
President — W. H. Gibson, Mountain Home, Idaho.
Secretary—Ira F. Shaffner, Boise, Idaho.

Engineers' Club of Oakland
President—R. S. Chew, Oakland Chamber of Commerce, Oakland.

Engineers' Club of Sacramento
President — George S. Nickerson, 914 Forum Bldg., Sacramento.
Secretary—P. M. Noeboe, State Department of Engineering, Forum Bldg., Sacramento.

United Engineering Societies of San Francisco
Chairman—C. D. Marx, Stanford University.
Secretary—Nathan Bowers, Rialto Bldg., San Francisco.

MISCELLANEOUS

American Ass'n for the Advancement of Science—Pacific Division
President—D. T. MacDougal, Director Desert Laboratory, Carnegie Institution, Tucson, Arizona.
Secretary (acting)—J. R. Douglas, 430 Library, University of California, Berkeley, Cal.
Meetings—Annual.

American Chemical Society—Oregon Section
Secretary—Norman C. Thorne.

Foreign Trade Club
President—W. H. Hammer, Monadnock Bldg.
Secretary—Wm. E. Hague, Monadnock Bldg.
Meetings—238 Merchants Exchange Bldg., San Francisco. Every Wednesday evening.

Pacific Coast Gas Association
President—John D. Kuster, care Pacific Gas & Electric Co., San Jose, Cal.
Secretary—Henry Bostwick, 445 Sutter St., San Francisco.

Society for Promotion of Engineering Education
Secretary—F. L. Bishop, University of Pittsburgh, Pittsburgh, Pa.

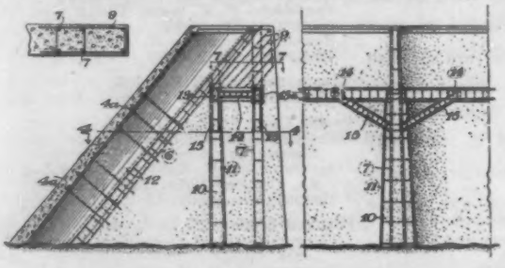
HAPPENINGS IN THE INDUSTRY

OREGON-CALIFORNIA INTERCONNECTION

The California-Oregon Power Company, with principal offices at Medford, Ore., completed by Nov. 15th a 70,000-volt transmission line, 35 miles in length, extending from Dunsmuir to Kennett, both in California. This line connects at Kennett with the lines of the Northern California Power Company and through them will tie in with the Pacific Gas & Electric Company system. Under this arrangement, the eight hydroelectric plants and 500 miles of transmission lines of California-Oregon Power Company will be interconnected with the great system to the south and will be able to deliver to it about 10,000 kw. in electric energy. The new connecting line enables the California-Oregon, which produces a surplus of power, to turn its excess into Pacific Gas & Electric system, which has a greater demand than it can supply.

A PATENT ON DAM CONSTRUCTION

A patent has been granted to Lars Jorgensen, consulting engineer of San Francisco, on certain improvements in the construction of multiple arch dams. It consists in the construction of multiple arches, each arch having the curvature of the up-stream and down-stream portions, so designed that the lines of pressure coincide approximately with the axes of the arches. It also includes the reinforcing of the dam by a hooped structure in combination with one or more lines of continuous struts located close to the springing lines of the arches and anchored at opposite sides of the canyon.



AS TO ELECTRIC POWER IN MINES

Peace has materially altered the plans of the Production Bureau of the United States Fuel Administration for conserving electric power used at coal mines. It had been planned to establish a field organization throughout the coal producing fields of the country in connection with obtaining increased efficiency in the use of electric power in coal production, but the return to peace conditions will make this organization unnecessary and the work will be undertaken on a restricted scale.

FOURTH LIBERTY LOAN ECHOES

If You Helped Your Employes Subscribe —

Do not fail to complete your Liberty Bond payments, is the appeal of Secretary of the Treasury William G. McAdoo: "Many employers throughout the country have rendered most patriotic assistance in the distribution of Liberty Loan bonds to their employes and have assisted them in the purchase of these bonds by arranging that payments may be made in installments covering a period of time longer than that which could be granted by the Treasury Department.

"It is the duty of the subscribers to bonds on these partial-payment plans to complete the contract into which they have entered.

"It is, of course, recognized that in case of necessity caused by sickness or other unavoidable circumstances, cancellations of subscriptions or sales of bonds are warranted.

In cases where employes have made arrangements to purchase these bonds on installment plans and then sever their connection with the employer with whom they have made subscriptions, arrangements should be made for the completion of the subscription or for having the subscription taken over by the new employer or by a bank in the community where the subscriber resides, thus avoiding the necessity for sale of the bonds covered by the subscription."

Twelfth District Subscription —

The Twelfth Federal Reserve District subscribed $459,000,000 to the Fourth Liberty Loan, or 114.2% of the quota of $402,000,000, according to official figures just announced by the Federal Reserve Bank. This district ranks seventh in the United States.

G. K. Weeks, General Campaign Manager, says that the final settlement of unadjusted accounts, including subscriptions by railroad employes in the Twelfth Federal Reserve District which were actually entered in other Districts, subject to credit back by the Treasury Department, is expected to increase the final figure of this District to more than $461,000,000.

Electrical Committee Success —

More than doubling its sales of Liberty Bonds for the Third Loan (when it broke all records by exceeding its former quota by 1100 per cent, for which it was awarded a 21-star honor flag), the Electrical Industries Committee of New York City, in conjunction with the Brooklyn Electrical Committee, in the Fourth Liberty Loan campaign just closed has rolled up a total of $19,368,000.

The work of the committee was organized by groups in the industry, the subscriptions obtained being as follows:

Electrical Manufacturers' Agents, Charles Crofoot, chairman	$ 457,800
Contractor-Dealers, Louis Kalischer, chairman	1,409,550
Elec. Machinery Manufacturers' Branch Offices, E. D. Kilburn, chairman	10,133,550
Electrical Societies, T. C. Martin, chairman	212,300
Electrical Supply Jobbers, George L. Patterson, chairman	1,938,700
Electrical Manufacturers in New York, J. Nelson Shreve, chairman	2,757,600
Brooklyn Electrical Committee, T. I. Jones, chairman	2,458,500
Total, New York and Brooklyn	$19,368,000

A STORE DEVOTED EXCLUSIVELY TO WASHING MACHINES

Wallace & Smith of Sacramento and Lodi have recently opened a "Washing Machine Store" at Stockton. The new store is devoted to the exclusive sale of washing machines. R. D. Smith, formerly connected with the Sacramento store, is in charge. This is the only store in the state to handle washing machines exclusive of other appliances.

TRADE NOTES

Change of Address —

W. I. Otis, Pacific Coast Manager of the Square D. Company, announces that the San Francisco offices of that company have recently been moved to 324 Rialto Building from 140 Second street. A cordial invitation is extended to visit the new premises.

Joins Association —

The American Vulcanized Fibre Company of Wilmington, Del., announces that it has become a member of the Rice Leaders of the World Association. This company manufactures Vul-Cot Fibre, and is the pioneer in the vulcanized fibre industry. The officials of the company include Claude W. Sutton, president; Colin C. Bell, vice-president; George B. Miller, treasurer; William J. Robinson, general superintendent, and William A. Jordan, general sales manager.

311 Stars —

The Service Flag of the Utah Power & Light Company, the Utah Light & Traction Company and the Western Colorado Power Company combined, which is displayed in miniature in all of their windows, contains the impressive total of 311 stars, representing approximately 20 per cent of the total regular working force of these companies. Three gold stars occupy the center of the field.

LETTER TO THE EDITOR ON THE HETCH HETCHY PROJECT

(The editorial, followed by the article on the present status of the Hetch Hetchy Project that appeared at great length in the last issue of the Journal of Electricity, has brought out an unusual amount of discussion in many quarters. This contribution by the city engineer of San Francisco is unusually timely and helpful. It is hoped that others interested will avail themselves of the columns of the Journal of Electricity for further discussion of this important subject.—The Editor.)

Sir:

For the past six years I have been associated with the Marin Municipal Water District, north of San Rafael, having been elected by the public as one of its directors to handle its affairs. This project met with a great deal of unwarranted opposition and criticism, but has finally been consummated and all the properties around Mount Tamalpais, including 11,000 acres, have been acquired for the people. Additional works, including the Alpine Dam, have been completed over there, which provides a basis for supplying 15 million gallons a day to a future population of 150,000 people. When you reflect that the present population is only 25,000 and the assessed valuation less than $15,000,000, you can realize the public spirit and cooperation exhibited to accomplish such a project of public ownership and remove the water problem from being the creature of peanut politics and private ownership graft.

The transbay region in Alameda county, with a population of 300,000, and a valuation of $240,000,000, furnishes a sad contrast in their present helpless condition, drinking Lake Chabot muddy water when they can get it and suffering in other ways. I sympathize sincerely with them and I attended two public meetings in Alameda and Berkeley to help them in the recent municipal water district. I believe the time is ripe in that region for all the people to get together in a municipal ownership water project, which should be the united creation of all the people and not a faction, though it always takes certain leaders of sections to give an impetus to such an undertaking. I believe the example cited of the Marin District in creating a $3,000,000 water project, which has not increased the taxes and with only one-third of its output yet for sale, should be illuminating to the residents of Alameda county.

San Francisco will only be too glad to welcome their cooperation, while realizing they have a very good undertaking on Hetch Hetchy alone and are quite willing to sustain it. With 50,000 horsepower created in a few years at an annual rent of $30 a horsepower, we should get enough revenue to pay for all the mountain work out of our investment and have the water delivered at the easterly edge of the San Joaquin Valley free. I believe the opportunity presents itself for the right kind of men to take hold of this Alameda project and you can rest assured that they will have my cordial cooperation.

M. M. O'SHAUGHNESSY,
City Engineer.

NATIONAL CHAMBER OF COMMERCE

Many phases of reconstruction will be taken up at the Reconstruction Conference of Industrial War Service Committees called by the Chamber of Commerce of the United States for December 3, 4, 5 and 6 at Atlantic City. The sudden termination of the war has brought reconstruction to the front as the one important problem today facing business men. In the congress of business interests at Atlantic City there is offered the opportunity for industry to assume the leadership

in dealing with those questions which primarily affect business.

For the purpose of facilitating discussion and coordinating the ideas of the various industries represented, the war service committees after meeting separately will gather together in 35 related groups. Afterwards these related groups will assemble as 10 major groups representing the ten primary industries within the United States.

The 10 groups as defined for the purpose of the conference are as follows:

Food Products	Wood and Wood Products
Textiles	Chemicals
Heat, Light and Power	Leather
Metals and Minerals other than Iron and Steel	Earthen Products
Iron and Steel	Industrial Professions

Among the 35 related groups are :

Oil and Oil Products (Animal and Vegetable)
Coal and Coke
Public Utilities
Oil and Oil Products (Mineral)
Gas Motors, Automobiles, Engines and the like
Steel and Iron Products, Fabricated or Manufactured
Steel and Iron Products, Cast
Machinery, Tools and Power Equipment
Farm Operating Equipment—Agricultural Implements, Fences, etc.

A list of twenty-five questions has been sent out by the War Service Executive Committee to the members of all war service committees for use as a basis for the deliberations of the individual war service committees at their first meeting. These suggestions are not considered exhaustive and members of the committees have been requested to present other subjects which they think should be discussed. The subjects are set forth in the following communication to the committees:

1. What legal methods or means could be introduced in the craft to better stabilize prices, during the reconstruction period, affected by the following:

   a. Inventories on hand.
   b. Orders placed at war prices but not delivered.
   c. Labor costs and conditions.
   d. Increased taxes.
   e. Increased rates of interest.
   f. An estimated increased demand for non-war materials restricted during the war period.
   g. Will an increased production of your commodity increase the price of material or labor, or will a controlled redistribution of material and labor from war industries prevent such an increase?
   h. Discuss the practice of the sale of commodities at a price less than the cost of production. Its injury and disturbance on the industries and the ultimate consumer. What methods would you suggest to remedy this evil?
   i. If the Government sees fit to dispose of used materials and products in the open market, what effect will it have on your production and the sale of new goods? At home? Abroad?
   j. If it is not advisable for the Government to sell these goods on hand, either at home or abroad, what shall it do with them?
   k. In this connection, what point of contact should business interests have with the Governmental departments in the sale or disposition of these various commodities?

2. What is the estimated amount of labor, skilled and unskilled, male and female, required for the estimated 1919 production? What is to be the source of labor? How much must be moved? How much have you lost to war industries?
3. What is your financing problem during the Reconstruction Period? Do you recommend Governmental aid? Is financial legislation needed? Should the Capital Issues Committee be continued during this period?

   In this connection discuss and recommend, what financial obligations, if any, the industries in your craft are under to the Government for moneys advanced for buildings, machinery or as loans or security for Government contracts. How are these to be liquidated or adjusted?

4. What method would you suggest for the cancellation of Government war orders with your craft, that would create the least amount of hardship on the industries and permit a readjustment to normal commercial conditions?
5. On undelivered Government orders, what percentage of materials on hand, supplied either by the Government or purchased by you for these Government orders, can be utilized by your craft for commercial purposes during 1919? What disposition shall be made of those not usable?

A UNION OF WESTERN ENGINEERING SOCIETIES

(An editorial which appeared in the August 15th issue of the Journal of Electricity, on the necessity for uniting engineering associations on the Pacific Coast for the solution of local problems, has called forth many expressions of interest from all sides. The following letters from men prominent in association activities show a general consideration of the idea.—The Editor.)

FROM THE PRESIDENT OF THE A. I. E. E.

I thank you for your letter of August 16th enclosing editorial in the current issue of your Journal. As this general subject is receiving very considerable attention in the Engineering Societies at the present time and as no definite course of action has as yet been adopted, I prefer to withhold comment until we have come to some agreement as to a program.

The program is not at all a simple one, although its importance has been keenly felt for some time past.

I feel sure that there has been some misapprehension on the part of our western members as to the distribution of Institute expenditures and particularly as to the margin of income over and above those expenses which are involved in matters of common interest to all the members.

This matter will be taken up at the earliest possible date and everything possible will be done to meet the wishes of the western members.

Very sincerely yours,

C. A. ADAMS.

FROM THE PRESIDENT OF THE A. S. M. E.

I have been giving the matter of reorganization of the engineering profession in America some thought and may have something to say about it in my annual address as President of the American Society of Mechanical Engineers. The Engineering Council also has this matter under consideration. I have not yet had time to formulate my thoughts, and therefore do not care to send you anything at present.

Very truly yours,

CHARLES T. MAIN, President.

A LETTER FROM THE CHAIRMAN OF THE SAN FRANCISCO SECTION A. S. M. E. TO THE NATIONAL SECRETARY A. S. M. E.

Our section is peculiarly located geographically and its relation to the parent society is somewhat different from the other sections of the Society in the East. We are removed by a distance of about 3000 miles from the center of activities, and the time and expense involved in covering this distance to New York and back make it prohibitive for most of our members to even attend an annual meeting, and at the same time it is incumbent upon them to pay $15.00 a year in dues, the same as local New York members, for which they receive the publications of the Society, together with the advantages of any activities of their local section. To this, of course, must be added the prestige afforded by membership in our society.

With this state of affairs the San Francisco Local Section should have, at least, one joint meeting of the engineering societies in San Francisco each year; and at least, one Section meeting of the Local Section, and at these meetings

papers should be read and discussed of local and general interest, and of such value that the Society will be glad to have the privilege of publishing them in the Proceedings.

Our plans for this year included a Joint Meeting of all of the Societies under the auspices of the San Francisco Local Section of the American Society of Mechanical Engineers and the first meeting was held on the evening of September 26th and was attended by 325 engineers.

Our program also included the setting aside of a large round table at the Engineers' Club for a meeting of the Local Section Committee at luncheon each Thursday at 12:30, to which all members of the Local Section are invited and welcome.

It was also our intention to follow up with, at least, three Local Section meetings, and the first to have been held on the evening of December 5th, for the consideration of a number of short papers on the subject of "Why is the Internal Combustion Engine not used more extensively for Marine Propulsion?"

The Pacific Coast has much good material for membership in the parent society and we have an active membership committee in the section, but one of the first questions asked by a prospective member is, "What do I get for my $15.00, as I seldom or never go to New York?" and this, you will see, is a difficult question to answer, but if the feeling exists that the parent Society is backing up our Local Section and helping to make memberships profitable to the Pacific Coast engineers, there will be little difficulty in increasing our membership. As a matter of fact, we considered the application of nine members at our last committee meeting.

Trusting that the Committee on Local Sections will see its way clear to help out the San Francisco Local Section, and that it will meet with your approval as secretary of the Society, I am,

Sincerely yours,
E. C. JONES,
Chairman San Francisco Local Section,
American Society Mechanical Engineers.

FROM THE SECRETARY OF THE LOS ANGELES SECTION, A. I. E. E.

I was glad to read your editorial regarding the formation of an engineers' club in each of the large coast cities and the attitude of the engineering societies toward western interests. I quite agree with your ideas and attitude on this matter.

You are no doubt familiar with the efforts made a year or so ago in Los Angeles to form an Engineers' Club and have club rooms. It could not be financed and the Joint Technical Committee was the result. This has been extremely successful in the work which it has undertaken and ought to have its functions greatly extended. There is no question that it could finally be an organization of much power and benefit.

Very cordially yours,
ARTHUR W. NYE.

A LETTER FROM THE NATIONAL SECRETARY OF THE N. E. L. A.

I have your esteemed favor of August 16th with regard to the situation in the field of engineering society organization work and am very much interested in the views and plans suggested in your editorial. It is rather hard, offhand, to decide what is the best plan in these matters. I shall probably write you again on this subject at an early date. In engineering, as in all other matters, particularly in these times, it is vitally desirable to realize that this is one country, and not a loosely related group of sections with varying interests.

Yours truly,
T. C. MARTIN, Secretary.

A LETTER FROM THE NATIONAL SECRETARY OF THE A. I. E. E.

This will acknowledge receipt of your letter of the 16th instant, accompanied by a copy of an editorial which appeared in the Journal of Electricity of August 15, relative to a proposed plan of closer cooperation of engineers in the West.

I appreciate your kindness in writing me upon this subject, and I am bringing your letter and the editorial to the attention of our president, Professor C. A. Adams.

Very truly yours,
F. L. HUTCHINSON, Secretary.

FROM THE CHAIRMAN OF THE PORTLAND SECTION, A. I. E. E.

Some months ago the American Institute of Electrical Engineers and the N. E. L. A. had a meeting to which was invited the Portland chapter of the American Association of Civil Engineers and the Oregon Association of Engineers. The A. I. E. E. was asked to appoint a committee to meet with the A. S. C. E. and the Oregon Engineers to consider the matter of club rooms for the joint engineering organizations and to employ some one to act as secretary with the view of keeping up an employment record already started by the secretary of the Oregon Association.

The A. I. E. E. committee in its report that now forms a part of the records in the hands of Mr. W. D. Scott, the secretary, did not favor the proposal and the report stated that we were exceedingly busy men and that our ranks had been depleted by men entering the service, and that there was no immediate need for keeping up an employment record. As a result of this committee, nothing has been done.

The matter contained in your editorial was thoroughly discussed here recently by Mr. Alfred Douglas Flynn, secretary of the United Engineers' Society. I believe I voice Mr. Flynn's sentiment in saying that we have enough clubs and societies, but concerted effort should be made for closer association and connection with the United Engineering Societies and other existing national bodies, and these bodies should lend us financial aid and send men to us, and we to them, that a more thorough understanding may be had by engineers of engineering and national needs in each section of the country.

Very truly yours,
R. M. BOYKIN,
Vice-Pres. and General Manager, North Coast Power Co.

FROM THE CHAIRMAN OF THE UTAH SECTION, A. I. E. E.

You are probably aware that for some years we have had in Salt Lake City a general engineering society called the Utah Society of Engineers. Because of the good and general work done by this society, which has always been an active organization, we have deferred the organization of local sections of the national engineering bodies until the past two or three years. At the present time we have local sections of the Mining, Civil and Electrical national bodies. None of these local sections are especially active, partially due to the fact that we did not wish to interfere with or duplicate the work of the general society here. The mining engineers are naturally the strongest body but these have never affiliated to any great extent with the Utah Society.

Recently we have started a discussion in regard to a change of organization in the Utah Society by which some scheme could be worked out whereby the members of the different national organizations would automatically be members of the general society, those not being members of the national organization becoming local or associated members of the general society. At present about one-half of the engineers in the vicinity who are members of national organiza-

tions are not members of the general society, this resulting in our forces being divided and being the reason why some change should be made to do away with this condition. After talking with the different ones interested in the matter it is quite certain that we will be able to work out a unified plan and I believe this will be accomplished this fall. This will mark a considerable advance in local conditions and strengthen us considerably.

Your editorial is very timely along these lines and it is quite certain that if we are to do our part in war work we must have proper organization. I believe that the eastern officers of the Institute are anxious to do all they can for us in the West, but it is of course difficult for them to appreciate our conditions. If general organizations can be maintained in each of the larger cities you mention it should greatly facilitate the exchange of qualified speakers which is one of our greatest problems.

Yours very truly,

A. I. PETERS,
Chairman Utah Section, A. I. E. E.

FROM THE SECRETARY OF THE SEATTLE ENGINEERS' CLUB

I wish to state that I certainly endorse the editorial referred to and wish to thank you for your efforts toward placing the engineer's fraternity of the West in a proper light before the engineers at large.

There is no doubt that the importance of engineering practice for projects in the far West is and has been overlooked by our friends in the East.

Our local Engineers' Club is exerting every effort possible to promote the interest of the profession and place the same on a higher plane than has been its lot in the past.

The keynote at the present time appears to me to be cooperation through the width and breadth of the land and I sincerely hope that individuals may forget their smaller differences, particularly at this time when the world is moving at such a rapid rate and there are so many opportunities for men to perform large duties in a large way.

I am,

Very truly yours,

E. J. BARTELLS.

COOPERATIVE CAMPAIGN CHRISTMAS ADVERTISING

(The Campaign of Advertising which was planned by the California Electrical Cooperative Campaign has been carried out with generous response by the Central Stations of the state and is being followed up in good style by the retail dealers. Owing to a change in general conditions with the coming of peace, the copy for the last four of these advertisements has been modified—and should be noted as given below. The letters sent out by the Campaign to Central Stations and Contractor-Dealers explain the details.—The Editor.)

TO CENTRAL STATIONS

Owing to the Armistice and the change in conditions, resulting therefrom, it has been deemed advisable to revise the advertising copy you are now using in connection with the work of the California Electrical Cooperative Campaign.

The Committee is handing you herewith four new advertisements concentrating upon Christmas purchasing, to take the place of those to be run December 2, December 9, December 16 and December 23 as appearing on the schedule you are now using. Will you kindly make use of this new copy and cancel the previous matter.

We wish to direct your attention to the Journal of Electricity for December 1, which features Christmas trade suggestions for the retailer, and to the cooperation the Journal is giving our advertising efforts.

With an expression of sincere appreciation of the very efficient manner in which you are making use of our advertising copy, we beg to remain,

Very truly yours,

CAL. ELEC. COOPERATIVE CAMPAIGN,
L. H. NEWBERT, Chairman.

TO ELECTRICAL CONTRACTORS AND DEALERS

The enclosed new advertisements were prepared to take the place of those scheduled to appear in newspapers on December 2, 9, 16, and 23 in connection with the work of the California Electrical Cooperative Campaign. This revised copy is to replace advertisements marked for these dates on the former schedule which, because of the Armistice, are no longer appropriate.

These new advertisements are for use particularly by Central Stations. You will observe that they are designed to assist you in selling appliances to the Christmas trade. We urge you to tie in with this campaign by trimming your windows and by advertising in your newspapers.

1st. Call on the Central Station Manager in your town and secure from him a definite schedule showing how and when the campaign advertisements will be run in your local newspaper.

2nd. Trim your windows with Christmas suggestions. Change the windows every week. Refer to the Journal of Electricity December 1st issue for suggestions on Christmas windows. You will also find Christmas window suggestions in sales building literature as furnished to you by various manufacturers.

3rd. Prepare four advertisements featuring appliances which you have for sale. Use cuts illustrating the appliances, and give prices in your advertisements. An advertisement on page 43, Saturday Evening Post Nov. 23, shows a good way of doing this.

It is suggested that you use short phrases from the Central Station advertisements whenever they will fit well into your advertisement. Phrases like—

"Electrical Gifts are
Sensible,
Practical,
Useful,
Appropriate."

"Useful Gifts for the Home
Give Lasting Pleasure."

"Give Her
An Electrical Labor Saving Appliance."

"Give Her
An Electrical Toaster."

may also be used.

4th. Run one of your advertisements on each of the four days following the days on which the central station advertisements are scheduled to appear.

5th. The Journal of Electricity issue of December 1st will be full of suggestions and ideas that should help you plan and carry out your part of this Christmas building campaign. We urge you to read it carefully.

If there is any information or assistance in connection with this campaign that you desire, do not hesitate to write us about it. We shall be glad to assist you in the preparation of copy for your advertisement if you will tell us what you want to advertise and what newspaper space you desire to use.

Time is short and we urge you to act at once.

Yours very truly,

ADVISORY COMMITTEE,
L. H. NEWBERT, Chairman.

The Government Asks You to Buy Only Useful Christmas Gifts

¶ What is more useful than electrical appliances? They make possible the saving of time, labor and money. This is a period in the history of the world when co-operation among nations is necessary for the welfare of millions. Our country is looked upon to aid in the reconstruction in Europe. A readjustment of our affairs is necessary to bring this about. Therefore, we all must heed our Government's warning to conserve. Anything that does not promote a saving of food, time, labor or money is a non-essential. When Christmas shopping, go to the store of an ELECTRICAL CONTRACTOR-DEALER and buy useful electrical appliances.

THE WAR IS OVER—NOW FOR A HAPPY, PRACTICAL CHRISTMAS

The war taught the great American people thrift and economy. With the coming of peace the vigilance to conserve should not be lessened. To the contrary, everyone should continue to save as much as possible of money, food and time for the further subscription to the great amount of charitable and social work necessary to relieve the distress in Europe and improve conditions in this country. An electrical appliance for a Christmas gift is useful the year round and saves time and money to devote to Red Cross and other readjustment work.

Advertisement No. 11—for use Dec. 2nd.

An Electric Washing Machine is a Necessary Christmas Gift

¶ More time now must be devoted to Red Cross and other charitable movements than ever before. Woman's part in war work has demonstrated the necessity of her participation in the tremendous labors of readjusting living conditions in the devastated areas. Therefore, increasing of household efficiency is of primary importance to the American housewife; and in Christmas giving, only useful articles should be purchased. The electric washing machine offers tremendous possibilities for labor, time and money saving. Ask your electrical CONTRACTOR-DEALER for complete information and a demonstration of this household necessity.

THE WAR IS OVER—NOW FOR A HAPPY, PRACTICAL CHRISTMAS

The war taught the great American people thrift and economy. With the coming of peace the vigilance to conserve should not be lessened. To the contrary, everyone should continue to save as much as possible of money, food and time for the further subscription to the great amount of charitable and social work necessary to relieve the distress in Europe and improve conditions in this country. An electrical appliance for a Christmas gift is useful the year round and saves time and money to devote to Red Cross and other readjustment work.

Advertisement No. 12—for use Dec. 9th

Your Christmas Gifts Can Relieve the Misery of War Stricken People

¶ Users of electricity have at their finger tips the agency for conserving essentials needed in the work of reconstruction. Although the war is over, the American people must continue to conserve. The world's food crisis will not have passed until the harvest of 1919 crops. In the meantime suffering Europe leans upon us. Therefore, when you use electrical appliances on your dining table, in the laundry and in your business, you make it possible for some one else to devote more time, more money or more labor to the worthy cause of war charities and other helpful organizations. Ask your electrical CONTRACTOR-DEALER to demonstrate the many essential electrical appliances.

THE WAR IS OVER—NOW FOR A HAPPY, PRACTICAL CHRISTMAS

The war taught the great American people thrift and economy. With the coming of peace the vigilance to conserve should not be lessened. To the contrary, everyone should continue to save as much as possible of money, food and time for the further subscription to the great amount of charitable and social work necessary to relieve the distress in Europe and improve conditions in this country. An electrical appliance for a Christmas gift is useful the year round and saves time and money to devote to Red Cross and other readjustment work.

Advertisement No. 13—for use Dec. 16th

Electrical Appliances for Christmas Gifts Bestow Double Blessings

¶ They make work easier in the household and they relieve some one from work and expense that can be devoted to the labors of humanity in restoring livable conditions in war-stricken Europe. Every ounce of energy saved on this side of the Atlantic makes itself felt in measure of pounds on the other side. As an illustration, electrical laundry appliances enable the housewife to do two days' work in one, thereby allowing one full day more for work in the Red Cross rooms. She may make additional garments that will save the lives of sick and wretched refugees in far-off lands. An electrical DEALER will explain the labor and time saving possibilities of electrical appliances.

THE WAR IS NOW OVER—NOW FOR A HAPPY, PRACTICAL CHRISTMAS

The war taught the great American people thrift and economy. With the coming of peace the vigilance to conserve should not be lessened. To the contrary, everyone should continue to save as much as possible of money, food and time for the further subscription to the great amount of charitable and social work necessary to relieve the distress in Europe and improve conditions in this country. An electrical appliance for a Christmas gift is useful the year round and saves time and money to devote to Red Cross and other readjustment work.

Advertisement No. 14—for use Dec. 23rd

CALIFORNIA COOPERATIVE CAMPAIGN ADVERTISING

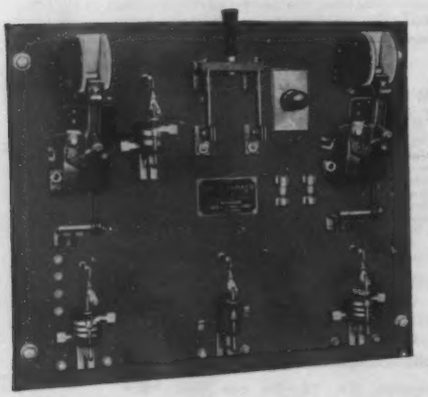
The forms suggested here are substitutes for those previously planned for the use of Central Stations who have volunteered to give up advertising space to this work. Contractor-dealers are urged to follow up this broadside with advertising giving prices and pictures. Owing to a removal of government restrictions by the National Council of Defense, the heading of Advertisement No. 11 has been changed to read "Give Useful Christmas Gifts." The text is changed to accord with the new situation.

LATEST IN EVERYTHING ELECTRICAL

(A protective panel for use in crane cabs removes the hazards of the open switchboard which offered no protection to the operator confined with limited head room in a cab of metal construction. An electric grinder of the bench type recently placed on the market and a heater with two heating elements and two reflectors are among the other new apparatus here described.—The Editor.)

SAFETY FIRST FOR CRANE AND OPERATOR

The average crane cab built a few years ago before the advent of safety first ideas, and even some cabs now manufactured, give practically no protection to the motors and actually present hazards to the operator. Picture a cab of angle iron and sheet metal construction with not a great deal of head room; a limited floor space with at least three controllers, the operator and his tools; then add to this a switchboard mounted in the cab, with four or more exposed knife switches and fuses, and you have conditions which make an accident to the crane, or operator, or both, very liable. There is no end of things that might happen and probably have happened to cranes and operators, due to this lack of electrical protective devices. By simply removing the dangerous open switch-board and installing in its place a crane protective panel (shown in the accompanying illustration) mounted in a steel cabinet, all the danger of the electrical shock will be removed and assured protection given to the motors and operator.

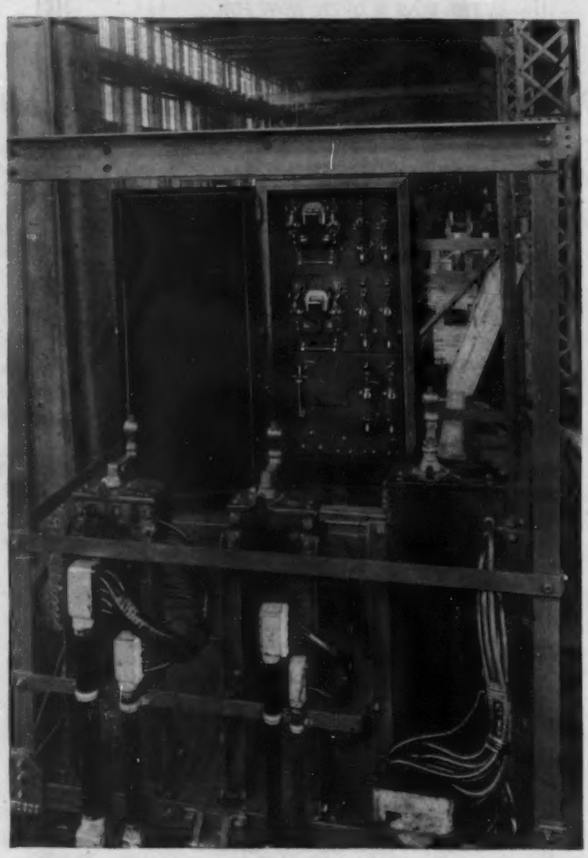


Standard direct current crane protective panel for use with manually controlled cranes

These panels take the place of the various circuit breakers, knife switches, fuses, etc., previously mounted in the crane cab, giving a complete switchboard on which is arranged all the necessary protective devices and safety features. No-voltage and overload protection is provided for each motor supplied through the panel, a thing hardly possible with the usual equipment. The control of the panel is obtained through a push-button station. The control circuit is so arranged that one clapper switch is closed when the "start" button is depressed and the other when the "start" button is released. In case an overload or ground condition remains the first switch closed would be opened when the second switch is closed, thus obtaining the "non-closing on overload" feature.

To start the crane the operator merely depresses the "start button for an instant before manipulating the motor controllers, this requiring far less time than closing numerous circuit breakers and fuses. To shut off the power from all circuits, he touches the "stop" button. If he wishes to inspect any motor, or leave the crane temporarily in an inoperative condition, he can withdraw the safety plug and take it with him. As a further preventative against starting the crane when it is stopped for any repairs, both the electrician and the crane operator can be provided with separate locks, which when inserted in hinged clips of the main line knife switch, prevent it from being closed.

The direct current crane panel shown in the smaller cut has all of the following apparatus: One double pole single throw knife switch, with means for locking the switch open by inserting one of two padlocks (one for the operator and one for the electrician); one main circuit, automatic reset overload relay on one side of the line; one automatic reset overload relay for each crane motor and connected on the opposite side of the line to the main circuit relay; two magnetically operated main line clapper switches, one for each side of the line; one operator's safety plug which will open the control circuit when removed from the panel; and two enclosed fuses in the control circuit and terminal lugs for external connections to main, motor heads, and control push-button stations.



Special crane protective panel for cranes having 3 polyphase motors. Panel provides two inverse time-element overload relays for each motor

The installation view shows a special alternating current protective panel for three polyphase motors. Each motor has two hand-reset, time limit overload relays, one in each of two phases, to protect the motors against overload. The two double pole magnetic main line switches open all three phases; the connections being so arranged to give double safety, for should one switch become inoperative the other would open two phases and stop the motor. These two switches are controlled from a push button station placed near the operator. The single pole knife switch shown in the lower left hand corner of the panel is also connected in the control circuit, and may be locked open with an ordinary

padlock to prevent accidental and unauthorized operation of the crane.

These protecting panels are made by The Cutler-Hammer Manufacturing Company of Milwaukee for cranes having either alternating or direct current motors aggregating 50 to 400 h.p.

AN ELECTRIC GRINDER

The U. S. Electrical Mfg. Co. has recently placed on the market as an addition to their line an electric grinder of the bench type.

The motors are especially designed and constructed for grinding and buffing work and are high in efficiency and power-factor. They are the totally enclosed, rigid riveted frame type with exposed laminations that facilitate heat radiation. Stator windings are multiple machine-wound coils of enameled cotton-covered wire, heavily insulated and treated with best insulating compounds obtainable, making a long-lived and reliable winding. All connections are encased in heavy cotton-covered paper tubes.

Rotors are of the squirrel cage type and embody our advanced type of construction, which makes them practically indestructible. No paper is used in their construction. Ball bearings are standard size and readily replaceable and of the heavy series, deep-grooved type with large factor of safety. Liberal reservoirs for lubrication are provided, from which grit and dust are excluded by specially constructed sealing rings incorporated in the housing. Spindles are heavy, one-piece construction of the best grade of spindle steel. Wheel mounting or arbor diameters are of standard dimensions, as recommended by the American Institute of Mechanical Engineers.

Wheel guards are of heavy construction and the No. 3 frame and larger are adjustable so as to allow the position of wheel in respect to guard to remain the same as the wheel wears down. The 5 h.p. sizes are provided with exhaust connection.

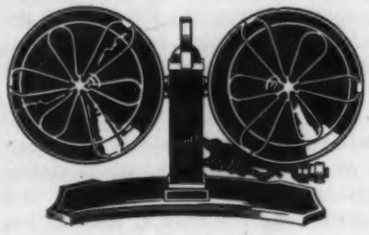
Pedestals on all grinders are extra large and heavy, giving rigidity and eliminating much vibration, due to unbalanced grinding wheels. Grinding rests are adjustable in any direction and can be removed if desired.

The waterpot in No. 3 frame and larger is a detachable unit and can be conveniently removed for filling and all sizes can be swung under the table out of the way. Push-button control or no-voltage release switches can be furnished as extra equipment, if desired.

These grinders have been sold by the thousands to the shipbuilding companies, as many as thirty being used by some of the larger shipbuilders. On account of the quantities that are being made, the prices are not so high as is ordinarily believed they might be for this kind of tool.

TWIN RADIANT HEATER

The "American Beauty" Twin Radiant Heater which is illustrated herewith, as its name indicates, is equipped with two heating elements and two reflectors, thus making it virtually two heaters in one.



These reflectors are adjustable, thus permitting the heat to be thrown in any desired direction or in two different directions at the same time. The heating elements are readily removable as also are the wire which guards them. The reflectors also are removable, thus making it possible to keep the heater in the most efficient condition by keeping all parts of it clean and free from dust. These features are very important and are exclusive with this heater.

This heater, which is manufactured by the American Electrical Heater Company of Detroit, the pioneer manufacturers of electric heating devices, is particularly adapted for use in the fall and spring when the furnace is out of commission. It conserves coal as with these heaters the furnace need not be started until really severe weather arrives.

The finish is antique copper. Its lines are attractive and its appearance in general most pleasing. It is light and equipped with a handle so it can easily be carried out and used wherever desired.

It comes fully equipped with an eight-foot cord, detachable plug and lamp socket plug ready for attaching to any ordinary lamp socket. The wattage of each heating element is 330, making a total wattage for the heater of 660 watts.

BOOKS AND BULLETINS

A War Bulletin—

Some attractive War Christmas advertising has been carried out by the Pacific States Electric Company in a campaign to their dealers. A reproduction of a page advertisement recently published is enclosed in a large envelope, the cover of which is used to urge the contractor-dealer to tie-in with this work by selling more electric appliances for Christmas gifts.

A Western Magazine

The successful growth of the Sunset Magazine has been watched with great interest by those interested in the development of the West. This paper stands alone among fictional publications in this region—but its stories and editorial policy have earned it a high place, both locally and nationally. The Sunset Magazine's work has been the devoted labor of a group to whom belongs the credit. The development of the magazine has resulted from the joint efforts of Charles S. Aiken, its editor for many years, James Horsburgh and Paul Shoup, both of the Southern Pacific Company, through whose vision and belief in the value of such a publication to the Coast the upbuilding of the magazine was accomplished. Others who came into the work later and gave of their devoted service, beside Charles K. Field, the present able editor, to whom this issue of the Journal of Electricity is dedicated as a "Builder of the West" as set forth on page 516, have been William Woodhead and Walter V. Woehlke.

Plans for After-the-War Trade

The time is now ripe for more centralized, concerted work on a program of economic reconstruction after the war, says a report of the Bureau of Foreign and Domestic Commerce, Department of Commerce. It is the first of a series of reports to be issued on this subject and is devoted to the plans under consideration by other countries, especially as they bear on future foreign-trade developments. Attention is called to the achievement of our own Government in preparing for after-war conditions, such as the building and organization of a huge merchant navy backed by large and efficient shipyards and docks, the Webb-Pomerene export trade act authorizing exporters to combine for export trade, and the leeway in foreign-trade banking now possessed by the Federal Reserve Board and banking system. All told there has been a very considerable amount of effective work done looking toward the future, but much remains undone and the Bureau is issuing this analysis of European tendencies as a guide, although calling attention to the fact that each country has its own peculiar problem that it must work out for itself. The report is entitled "Economic Reconstruction," Miscellaneous Series No. 73, and is on sale at 10 cents a copy by the Superintendent of Documents, Government Printing Office, Washington, D. C., and by all the district and cooperative offices of the Bureau of Foreign and Domestic Commerce.

Of General Interest

The fifth annual report of the Arizona Corporation Commission of the State of Arizona has just been received. The report suggests the desirability of certain amendments to existing statutes but it withholds specific recommendations until the publication of the sixth report.

Christmas Orders

The G. E. Division of the Edison Electric Appliance Company has issued a letter to central stations and dealers with suggestions for Christmas orders. A correction in their catalogue is also noted.

New Bulletins and Leaflets

A reprint of advertising recently appearing in national magazines is sent out by the Benjamin Electric Company to indicate the support they are giving their dealers.

A description of the Matthews Holdfast Lamp is combined with an appeal for war charities in an attractive folder being sent through the mails by W. N. Matthews & Brother, Inc., of St. Louis.

Bulletin No. 45203 of the General Electric Company describes Circular Coil Transformers of various types. These are oil insulated and self or water cooled.

Highway Cost Keeping

Highway Cost Keeping is the subject of a helpful treatise by James J. Tobin and A. R. Losh, published by the U. S. Department of Agriculture as Bulletin No. 660.

National Safety Code

The scope and application of the National Electric Safety Code are surveyed in a circular issued by the Bureau of Standards under the title (No. 72). This bulletin should be in the hands of all central station officials and others whose work comes under the rulings of the code.

Annual Report

The Twelfth Annual Report of the Pacific Gas & Electric Company for the year ending Dec. 31, 1917, contains a summary of correspondence with President Wilson on the importance of public utilities as well as statistical data and reports.

Brakes for Alternating Current Service

Motor-Operated Brakes for Alternating Current Service is the title of a new four-page standard descriptive booklet, known as Booklet "A," being distributed by The Cutler-Hammer Manufacturing Company of Milwaukee. This booklet points out the application and desirable operating features of these brakes. Two installation views are included—one showing the brake applied to a large mine hoist motor, and the other, to a motor-driven elevator machine.

National Board of Fire Underwriters

The list of Inspected Mechanical Appliances published by the National Board of Fire Underwriters is to be had by application to the Underwriters' Laboratories at 207 E. Ohio street, Chicago.

Two New Catalogues

The American Vulcanized Fibre Company has recently issued two attractive catalogues describing their product, one entitled "Vul-Cot Fibre—Special Catalogue of Parts for Electrical, Mechanical, Automobile and Railroad Uses," and the other "Vul-Cot Fibre—The Material with a Million Uses."

Riveted Joint Tests

In analyzing the stresses in a rectangular frame, it is customary to assume that the connections are rigid. If the connections are not perfectly rigid, it is evident that the actual stress may not be equal to the computed stress. Tests to determine whether serious error is introduced into computations for stresses in steel frames by the assumption that the joints are perfectly rigid have been completed by the Engineering Experiment Station of the University of Illinois under the direction of Wilbur M. Wilson, assistant professor of civil engineering, and Herbert F. Moore, research professor of engineering materials, and the results given in detail in Bulletin 104 entitled, "Tests to Determine the Rigidity of Riveted Joints of Steel Structures."

Battery Charging Equipment

Battery Charging Equipment for electric vehicles and industrial trucks is illustrated and described in a four-page two-color pamphlet just issued by The Cutler-Hammer Manufacturing Company of Milwaukee and New York. Four large fleets of electric vehicles typical of those charged by C-H Sectional Charging Equipment and an 18-circuit 18-section equipment are shown. Emphasis is laid on the importance of keeping the batteries of industrial trucks properly charged. The loss of only an hour a day due to improper charging cancels part of the big results obtained through the use of electric trucks. The adaptability of electric battery trucks and vehicles for all kinds of haulage problems is also emphasized.

Mining Bulletins

J. W. Thompson has abstracted Current Decisions on Mines and Mining for the period from Sept. to Dec., 1917, in Bulletin 164 of the Bureau of Mines.

Potash is the subject of a general circular of information issued by the Experimental Ore Dressing and Metallurgical Plant of the Colorado School of Mines.

Bulletin 123 of the Bureau of Mines is a compilation of reports on Analyses of Mine and Car Samples of Coal Collected in the Fiscal Years 1913-1916. The authors are Arno C. Fieldner, Howard I. Smith, J. W. Paul and Samuel Sanford.

Methods for Routine Work in the Explosives Physical Laboratory of the Bureau of Mines are described by S. P. Howell and J. E. Tiffany in Technical Paper 186 published by that bureau.

Notes on Lignite, Its Characteristics and Utilization, by S. M. Darling are sent out in manuscript form by the Bureau of Mines.

Revised Catalogues

The "Exide", "Hycap-Exide" and "Thin-Exide" Batteries for Electric Vehicles are listed in a new edition of Section V and Price List V which has just been issued by The Electric Storage Battery Company. Section AB, second edition, covering the "Chloride Accumulator" and "Tudor Accumulator," is also a recent revision of their catalogue series and lists these batteries which are extensively used in various classes of storage battery service.

McGraw List of Electrical Dealers, Contractors and Jobbers, 1918

By McGraw-Hill Company, Inc., published annually. Size 4½ by 8½ in.; 344 pp.; published by the McGraw-Hill Company, New York, and for sale by the Technical Book Shop, San Francisco. Price $10.00.

This book contains a list of the electrical contractors, electrical dealers and electrical engineers engaged in retail selling. Notations of all dealer establishments selling electric fixtures are also made in the lists. In the rear of the book a list is also given of the jobbers that handle electrical ware as well as a list of manufacturers' agents. There is also appended a list of department stores and other non-electrical distributors.

The lists are all made according to states and then alphabetical arrangement of cities within the various states.

The book is unquestionably the most authentic and reliable source of information along the lines of information attempted. It should receive wide use in the West as by it one means of getting better acquainted in a sparsely settled country is thus afforded in addition to the commercial value of knowing accurately those who are associated in a great and growing industry.

NEW ELECTRICAL DEVELOPMENTS

(The recent rains in the central Pacific and southwestern regions have relieved the power shortage and promise a plentiful water supply for next year. In the northwest the government has refused to make the loan expected for extension of their car system by Seattle, but is to carry out the navy construction program as planned. Several irrigation and reclamation projects involving electrical features are planned.—The Editor.)

THE PACIFIC NORTHWEST

SEATTLE, WASH.—The Reardon Electric Co., of Seattle has been granted a degree of dissolution.

POWELL RIVER, B. C.—The Powell River Pulp and Paper Company contemplates rebuilding its mills, at a cost of about $40,000.

PORTLAND, ORE.—The General Electric Co., of Portland has entered a bid of $3,945.15 to furnish a 400-hp. synchronous motor to the city water department.

PALMER, WASH.—The Pocahontas Coal Company at Palmer, Washington, has installed a large electrically operated compressor in connection with its coal mine.

ABERDEEN, WASH.—The Grant-Smith Shipyard at Aberdeen, Washington, has erected a new transformer house. The boiler house has been enlarged and new steam heating plants will be installed.

SEATTLE, WASH.—The street railway employes union has asked the city council of Seattle, to guarantee the union scale of 50, 55 and 60 cents an hour, pending the negotiations of the street railway system by the city.

ANYOX, B. C.—In connection with a plant now in course of construction by the Granby Consolidated Mining Co. for the production of coke, ground has been broken for the erection of a new power plant for operation.

SEATTLE, WASH.—A. H. Cox & Company, 307 First avenue South, Seattle, recently sold to the government for use at the penitentiary at McNeil Island, hoist, concrete slip, small punch and shear and two five horsepower motors.

SEATTLE, WASH.—Plans have been completed by company engineers of the Puget Sound Traction Light & Power Company for the re-roofing at once of the company's lighting station at 4237 7th avenue, recently damaged by fire.

TACOMA, WASH.—Application has been made to the city light department for 10,000 kilowatts of electric power from a Colorado iron company which would mean if granted approximately $200,000 annual income for the light department.

SEATTLE, WASH.—NePage, McKenny Company, electrical engineers and contractors, Armour building, Seattle, have been awarded the contract for the installation of complete electrical equipment in the new dock of Rogers Brown & Company on Harbor Island at about $3000.

TACOMA, WASH.—City Engineer Manley is completing plans for the double tracking of the municipal tide flats car line. The work, which is estimated to cost $250,000 will include two loading platform stations on 10th St., and a similar station will be built at the Todd plant end of the line.

SEATTLE, WASH.—Preliminary plans are now being prepared by Structural Engineer F. A. Rapp of the city engineers's staff covering the construction of the elevated trestle on the West side of the West Waterway for the municipal elevated electric railway line under construction.

SEATTLE, WASH.—A. H. Cox & Company, 307 First avenue South, Seattle, have received five triple and double drum hoists together with four band saws of different size. Some of these are to be placed on the floors of the company for display purposes and others are to be used in special installations. The company has also just received a carload of motors ranging in horsepower from 250 down to 7½.

BELLINGHAM, WASH.—Six cent fare has been put into operation at Bellingham, Washington, on the lines of the Puget Sound Traction Light & Power Company. The Company has on sale the new Liberty coin Ticket made of aluminum. There is no extra charge for transfers and the price of school tickets remains the same.

ASTORIA, ORE.—The Port of Astoria Commission has voted to employ an engineer to make a complete report on the available water power in the state together with the probable cost of transmitting electricity to Astoria in quantities sufficient to meet the present needs of the industrial plants and to provide additional power for the future.

SEATTLE, WASH.—Eighteen per cent increase in telephone rates for the state of Washington is justified according to a decision reached by the State Public Service Commission which was asked by Postmaster General Burleson to consider the proposed advance. The city of Seattle, through its corporation council will fight the higher charges.

SEATTLE, WASH.—Corporation Counsel Walter F. Meier and James B. Howe, attorney for the Puget Sound Traction Light & Power Company are drawing tentative ordinances to be submitted to the city council at an early meeting covering the purchase by the city of Seattle street railway properties of the Puget Sound Traction Light & Power Company.

YAKIMA, WASH.—About 20,000 acres of new land will be reclaimed this season with the use of five dragline excavators that will be operated in drainage work on distribution canals. The United States Indian Reclamation Service has set aside $500,000 to be spent in this work. Many concrete structures will be required in connection with the system of canals and drains in which hydro-electric power stations will be installed.

SEATTLE, WASH.—A further utility bond issue of $1,755,000 for the extension of the municipal light and power system was authorized recently when the council passed a bill providing for such bonds, the proceeds to be used for making service extensions for connecting the systems of the city and the Puget Sound Traction Light & Power Company and for the retirement of warrants issued against the light fund for extensions.

COLFAX, WASH.—The city council of Colfax, Washington, has voted to adopt the proposition of the Washington Water Power Company, presented by M. J. Osborn of a light rate reduction of 16 per cent in the resident district and a reduction of 10 per cent each in the business section and street lighting section and call off the fight for lower rates in the city which has been before the State Utilities Commission for the past four years.

BREMERTON, WASH.—In carrying out the program of renewing activities interfered with by the war, the navy department has announced that plans are being laid to go ahead at once with development work at the Bremerton navy yard. This means spending money already appropriated for the purpose including $329,000 for a power plant and distributing system, $300,000 for the purchase of additional land. In addition it is announced that the construction program for larger ships at Bremerton will be carried out and keels laid down as soon as possible.

SEATTLE, WASH.—The appeal of the Federal Government relative to the action against the Puget Sound Traction Light & Power Company and the Stone & Webster interests to withhold entries of power sites along the Nooksack river in Washington was perfected some time ago by Frank Hall, special assistant to the attorney general at San Francisco. The case was recently decided against the government in the district court at Seattle and appeal was taken immediately to the circuit court of appeals, where it will probably be heard at the May term.

SEATTLE, WASH.—Plans for the construction of a heavy-timbered smelter building to be erected on the seventh slip of Commercial Waterway District No. 1, will be completed shortly by Architect Francis W. Grant, Mehlhorn building. The building is to be the property of the Smelters Steel Company, White building, and will be approximately 90 by 100 feet in size and contain 10,000 feet of floor space. The company will install electric furnaces for converting the ore into cast pigs by a modern electric process. It is anticipated that the first furnace will be in operation by February 1st.

SPOKANE, WASH.—Commissioner Fleming of Spokane, states that if the State Public Service Commissioner of Washington stands by his present ruling raising the minimum monthly electric light rate in Spokane from 70 cents to $1.00 the city council should take steps at once to call an election on proposals to acquire a river power site for the purpose of building a municipal light and power plant. It was on the Petition of the Washington Water Power Company and the Spokane Heat, Light & Power Company that the Public Service Commission granted the rate about which complaint is being made and this became effective November 10. On complaint being made to the Public Service Commission this rate has been suspended until December 10.

SEATTLE, WASH.—A. M. Taylor, chairman of the transportation and housing division of the United States Emergency Fleet Corporation states that the Government will not make the $339,000 loan, which city officials of Seattle state was agreed upon for the purchase of new street cars and the extension of the municipal system of that city. Taylor states in a telegram to the city that it bought the cars on its own motion and obligated itself to pay for them out of its own funds. He also stated that whatever reason there might have been several months ago for federal assistance in improving Seattle's transportation service it no longer held good. He further asserted that street cars that could have been used to haul shipyard workers have been lying unused in Seattle car barns; that there has been serious delay in establishing new track connections and that if construction of additional track facilities were started at that late date (October 13) they could not be completed in time to meet the urgent requirements of the shipbuilding program. The city is preparing to carry through the improvements alone and has already received the 25 street cars involved and the city comptroller will transfer $217,000 from the general fund to the street railway fund to pay for the cars.

THE PACIFIC CENTRAL DISTRICT

MANTECA, CAL.—W. F. McClure, state engineer, has given his approval of the special election in the South San Joaquin irrigation district for a $500,000 bond issue at an early date.

SAN FRANCISCO, CAL.—F. W. Frost, treasurer of the Key Route, announced recently that his company had deposited funds with the Wells Fargo National Bank to pay coupon No. 19 on the general consolidated mortgage, 5 per cent bonds of the San Francisco, Oakland & San Jose Consolidated Railway—one of the many subsidiaries of the Key System. This coupon was due on November 19, 1917.

SAN FRANCISCO, CAL.—Bond interest and redemption of bonds of the Municipal Street Railways, amounting to $222,000, has been recommended paid by the Supervisors' Finance Committee out of accumulated earnings. Of this sum $100,000 is for the redemption of bonds issued for building the roads, and $122,000 is for interest on the outstanding bonds.

BLYTHE, CAL.—A telephone system will be installed at Fertilla, Manager Kamas having closed final arrangements with Dr. Ghiglieri.

OAKLAND, CAL.—Residents of this city are to be given an opportunity of voting on municipal ownership of the street car lines of the city at the next general election, according to an announcement of Mayor John L. Davie.

STOCKTON, CAL.—The Board of Education of the city of Stockton, recently called for bids for furnishing all labor and materials necessary for the installation of the electrical work in the Lottie Grunsky School in Stockton.

SAN FRANCISCO, CAL.—The United Railroads and the Municipal Railway will make joint use of the tracks west of the Twin Peaks Tunnel if the recommendation of the Public Utilities Committee is followed by the Board of Supervisors.

SACRAMENTO, CAL.—Building Inspector George J. Calder has presented to the Board of Education plans and specifications for lighting fixtures for the new Washington school building. He estimates the cost will be about $1500. Bids were ordered advertised for.

COLUSA, CAL.—A plan is on foot here to form an irrigation district between Williams and Colusa under the Wright Act, to comprise about 10,000 acres of land. The area is chiefly rice land. Plenty of water could be obtained from Wells or from the Sacramento River.

OAKDALE, CAL.—An agreement has been reached by which the old Knight's Ferry power plant will again be put into operation in order to supply power to munition and shipbuilding plants around the bay. About $5,000 has been expended to put the plant in running order.

WILLOWS, CAL.—The Princeton-Codora-Glenn Irrigation district has sold its $175,000 worth of bonds to McDonnel & Co., of San Francisco for $175,000. The bonds carry 6 per cent interest. The district comprises 13,500 acres lying partly in Glenn County and partly in Colusa County.

SACRAMENTO, CAL.—The Sacramento Board of Supervisors has awarded to the Roberts Manufacturing Company of San Francisco, for the sum of $2,075, the contract for furnishing the lighting fixtures for the Women's Surgical Ward and Maternity Ward Building at the County Hospital.

MERCED, CAL.—Two new lighting districts are in prospect for this county. The voters of Irwin district will ballot on the question of forming a lighting district there. The Supervisors will grant a hearing on a petition from South Dos Palos asking for a lighting district to be formed there.

SAN JOSE, CAL.—The bid of the Century Electric Co. of $1120 for the delivery of a 75 h. p. 900 r. p. m. General Electric type K, 1918 model, three phase, 220 volt motor, with pulley, base, oil and H3 compensator with overload relay and no-voltage release, was accepted by the Supervisors.

SAN FRANCISCO, CAL.—The Public Utilities Committee of the Board of Supervisors agreed to report in favor of accepting the offer of the Yosemite Power Company to lease to the city what is known as the Gold Rock ditch in the Hetch-Hetchy valley for $20 a month. The City Engineer recommeneded acceptance of the offer. In offering Gold Rock ditch to the city the power company agrees not to tax the municipal lessee for repairs to the ditch, any lawsuits that may be brought by injured employes.

ALAMEDA, CAL.—The Alameda Water District has asked the Railroad Commission not to permit the Spring Valley to complete the hydraulic fill dam at Calaveras until the plans have been investigated and approved by the Commission.

SAN FRANCISCO, CAL.—The Board of Public Works has awarded the contract for furnishing and delivering electric motors for blowers Contract No. 49, Main Aqueduct, Mountain Division, Hetch Hetchy Water Supply to the Westinghouse Electric & Manufacturing Co. for the lump sum of $1702.42.

SACRAMENTO, CAL.—The Pacific Gas & Electric Company was granted permission by the City Commission to withdraw its bid for a franchise for the operation of its two buses which connect with the M and P Street cars at 28th street, and run over Folsom Boulevard, Thirty-ninth stret and Stockton Boulevard.

SAN FRANCISCO, CAL.—The Butte Engineering & Electric Co., 683 Howard street, San Francisco, has been awarded the contract for the electrical work on the alterations to the two-story building of the Langendorf Baking Co., 1156 McAllister street. The architect is Nathaniel Blaisdell, San Francisco. The total cost will be $2803.

TERRA BELLA, CAL.—The 1918 irrigation season in the Terra Bella irrigation district closed October 20, after a continuous run of seven months. The cost has been held down to around $7 per acre foot. The district will increase its water supply for next season by drilling additional wells. I. H. Althouse is superintendent in charge.

SACRAMENTO, CAL.—The Pacific Gas & Electric Company, having refused to abide by the ultimatum of Mayor D. W. Carmichael—that the corporation withdraw its application to the Railway Commission for an increase of the street car fare in Sacramento from five to six cents—the jitneys have again been given the freedom of the streets.

SAN FRANCISCO, CAL.—The Sierra & San Francisco Power Company of San Francisco and the Coast Counties Gas & Electric Company of Santa Cruz have petitioned the State Railroad Commission for an extension of time in which they must reconstruct their overhead lines in order to comply with the law of safety in reference to telephone and other electric lines.

SAN FRANCISCO, CAL.—The Pacific Gas & Electric Company has been authorized by the State Railroad Commission to issue $5,000,000 in bonds, to be sold at $85, or $5,000,000 in capital stock, to be sold at not less than $82.50, the proceeds to be used to reimburse the treasury of the company for capital expenditures made before May 31, 1918, and to finance future construction work.

TULARE, CAL.—The 6000-acre improved ranch belonging to the Pacific States Corporation, and known as the Tagus ranch, situated five miles north of Tulare, is to be cut into small ranches of 20 acres and larger. There are 23 20-horsepower electric pumping plants on the ranch, nearly one for each quarter section, which insures an abundance of water for irrigation purposes.

CHICO, CAL.—Geo. Welch, secretary and manager of the Phelan interests, has awarded contracts for the pumps, motors and culverts for the irrigation system to be installed on the Phelan ranch. The contract for the pumps was awarded to Byron-Jackson Co., of San Francisco; the contract for the motors to the Westinghouse Electric Co., and that for the culverts, 2000 feet, to the California Redwood Co., of San Francisco. The three contracts mean an outlay of over $30,000. The entire cost of the irrigation system is estimated to be $60,000.

SACRAMENTO, CAL.—The Third District Court of Appeals has confirmed the decision of the Lassen County Superior Court in the case of Equitable Trust Company of New York against the Western Land & Power Company, August Anderson and Emily C. Dodge, et al. The action was to foreclose on a deed of trust or first mortgage on lands in Lassen County, made by the defendant to secure a $500,000 bond issue. The trust company issued 290 thousand-dollar bonds and 360 five hundred-dollar bonds. The power company failed to pay the interest, and the majority of the bond holders requested the trustees to foreclose, so the action was brought, the power company defaulting.

THE PACIFIC SOUTHWEST

SAN DIEGO, CAL.—Work on the extension of the car line to the concrete ship building plant has been started. It is estimated that $57,000 will be required to make this extension.

LOS ANGELES, CAL.—In connection with the new service building to be erected at the site of the tubercular hospital at Sylmar, considerable new electrical equipment will be required. It is proposed to install six new refrigerating departments.

SAN DIEGO, CAL.—Plans are under consideration by the Bureau of Yards and Docks, Navy Department, Washington, D. C., for additional buildings at the Naval Air Station, to cost about $410,000 (Specification 3611).

LOS ANGELES, CAL.—Plans are being prepared for the erection of a power house in the San Antonio Canyon above Hogsback for the Ontario Power Company, to cost about $60,000. Glenn D. Smith is general manager.

LOS ANGELES, CAL.—The San Joaquin Light & Power Corporation has announced dividend No. 16 of $1.50 per share on the preferred stock, declared to stockholders of record November 30, 1918; payable December 14, 1918.

NEWPORT BEACH, CAL.—In connection with the installation of the new sewer system, contract for which was recently awarded to the J. D. Kneen Contracting Co., Santa Monica, at a cost of $172,371.14, a new pumping station will be erected. It is understood that the new plant will be electrically operated.

RIVERSIDE, CAL.—The Nevada-California Power Co. and its subsidiary organization, the Southern Sierras Power Co., are planning for extensions in their power plants Nos. 2, 3, 4, 5, and 6, at Birch Creek, Inyo County, to increase the present capacity. The work is estimated to cost approximately $85,000.

LOS ANGELES, CAL.—The unusually heavy rainfall in California in September was responsible for a marked falling off in gross revenues of the Southern California Edison Company for that month as compared with the income for August, the decline being due directly to a curtailment of the demand for water for irrigation purposes, one of the company's most profitable sources of revenue. On the other hand, officials of the company estimate that the storage of water in its reservoirs this year is considerably greater than last year, which should be reflected in later earnings.

THE INTER-MOUNTAIN DISTRICT

JULESBURG, COLO.—Improvements to the municipal electric light plant to cost $70,000 are under consideration.

PROVO, UTAH.—The Beaver River Power & Light Company of Provo has changed its name to the Telluride Power Company and increased its capital stock from $400,000 to $1,000,000.

GREAT FALLS, MONT.—The Great Northern Railway Company is considering improvements to its local yards, including the erection of new shops, to cost about $250,000. A. H. Hogeland of St. Paul, Minn., is chief engineer.

GREAT FALLS, MONT.—The new sub-station of the Montana Power Company at Tenth Street and First Avenue is nearly completed. The building and equipment will represent an expenditure of about $200,000 and is designed to provide for power requirements of the city for many years to come.

HASH IS NOT MADE, according to a cook in the navy — it accumulates. This is just what happens to those miscellaneous bits of interesting gossip which find their way into the Office Vacuum Cleaner and are here served up as an appetizing dish, hot and savory. Moreover, though you would never guess it from his voice, the Vacuum Cleaner has a sense of humor and is not to be taken too seriously. The spice may be an added ingredient put in for good measure.— The Editor.

Solid and not easily upset, is the verdict you would probably pronounce on Fred D. Weber, whose picture appears here. And yet one of the Portland boys writing from France says that if only Weber could see the combination of French and American material patched together in some of the jobs behind the lines—he would have a duck fit. You see, Weber is chief electrical engineer of the Oregon Insurance Rating Bureau in Portland and is accustomed to having fits when the work isn't up to specifications. Besides this job, he is the Oregon correspondent for the Journal of Electricity and is a big enough man to fill both positions. In this picture Weber is evidently standing on the roof which is no place for any man to be upset.

The End of the War does not lessen the appropriateness of this poem, which is a renewed proof that the electrical fraternity does not need bloodshed to inspire its muse, but is inherently poetical. The verse has passed from hand to hand until knowledge of the exact point of origin has been lost, but the electrical affiliations of the author are established by his intimate comprehension of the situation of the moment.

A WAR TIME LULLABY

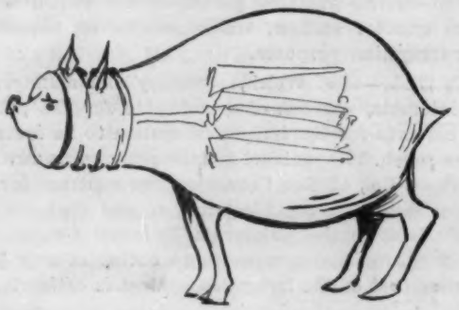
Keep your temper, gentle sir,
Writes the manufacturer;
Though your goods are overdue,
For a month or maybe two,
We can't help it, please, don't swear,
Labor's scarce, and steel is rare;
Can't get gas, can't get dies;
These are facts — we tell no lies.

Harry's drafted, so is Bill,
All our work is now up-hill;
So your order, we're afraid,
May be still a bit delayed.
Still you'll get it, don't be vexed,
Maybe this month, maybe next;
Keep on hoping, don't say die,
You will get it by and by.

Job 23 sounds like a reference to the Bible, but in reality it is part of the construction sign of an electrical contractor who is taking advantage of his work on a new house to advertise his business. This is apropos of a criticism recently made that the electrical contractor-dealer does not take advantage of his opportunities to see his name in print—and incidentally to let other people see his name. Switch panels which he installs bear the name of the manufacturer, as do also the motors and larger household and other apparatus. It is not beyond his rights to take advantage of these spaces for his own nameplate. Job, as quoted above, was noted for his patience and long-suffering and by proper advertising you might well become famous for service and honest dealing. Try it once.

Speaking of the masks, now that the rigors of the health rulings have been removed it is perhaps in good taste to comment on the changed appearance of some of our friends. San Francisco was the first city to make the wearing of these white muzzles obligatory and the north and southwest regions promptly followed suit. It was astonishing how the character of a man's face was emphasized by the harem effect. Some of the electrical men looked like Raphael's little angels peeping above a cloud, but it must be confessed that more bore the appearance of the chief pirate in Gilbert & Sullivan's opera. For the first few days there were many styles of wearing them, from a bandage over the mouth above which the nose appeared in stately prominence (this prevented the subject from biting one, at any rate) to a bib under the chin, much adopted by smokers. Later with stricter measures by the police the public presented a more uniform appearance as indicated by the sketch. However, as one electrical man remarked, these measures were not so strange to the West. In the old days they used to wear something similar in Montana—except that then it was worn a little higher with two slits.

It looks like a domestic animal, this fifth of the series in our electric zoo — and indeed it answers throughout that description. It is found in every household and its faithfulness and brilliance have so thoroughly offset a tendency to light headedness that it has endeared itself to every owner.



THE MAZDA LAMP

This is the brightest little chap
You never saw him beat—
A model for all arguments,
He gives us light, not heat.